



FRIDAY, NOV. 29.

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Contributions.

Forging Wrought Iron.

TO THE EDITOR OF THE RAILROAD GAZETTE.

I read with a great deal of interest a while ago Coleman Seller's paper on squeezing steel into shape, which was published in the *Railroad Gazette*, but the conditions of forging wrought iron are entirely different from those of steel, and I write to ask if you know of any data extant on the subject. Will you not be good enough to ask in your paper for information from your readers who have been in Europe this summer looking up the subject?

Annealed Steel in Locomotive Works.

Baldwin Locomotive Works,
Burnham, Parry, Williams & Co.,
PHILADELPHIA, Nov. 23, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE.

The last paragraph of the article entitled "Steel in Locomotive Boilers," page 772 of your issue of Nov. 22, conveys an impression unjust to some of the locomotive builders other than the well-known and highly-esteemed works which it specifically mentions. We refer to the intimation that while other builders have included in their specifications a clause calling for all sheets to be annealed after flanging, the work is not done, or imperfectly done, over a wood fire, and not in a properly-constructed annealing furnace. We call your attention to the paragraph on pages 40 and 41, of the "History of our Works," published in 1881, as follows:

"Steel fire boxes were first built for some engines for the Pennsylvania Railroad Co. in 1861. English steel of a high temper was used, and at the first attempt the fire boxes cracked in fitting them in the boilers, and it became necessary to take them out and substitute copper. American homogeneous cast steel was then tried on engines 231 and 232, completed for the Pennsylvania Railroad in January, 1862, and it was found to work successfully. The fire boxes of nearly all engines thereafter built for that road were of this material, and in 1866 its use for the purpose became general. It may be added that while all steel sheets for fire boxes or boilers are required to be thoroughly annealed before delivery, those which are flanged or worked in the process of boiler construction are a second time annealed before riveting."

With the exception of the first two locomotives above referred to, built in 1861 for the Pennsylvania Railroad, with fire boxes of imported "Cammell" steel, the fire boxes and all steel boiler plates flanged or worked in our shops have been carefully and thoroughly annealed in furnaces constructed especially for this purpose. We have also kept pace from time to time with the increasing size of locomotives by providing furnaces large enough to take the largest plates.

BURNHAM, PARRY, WILLIAMS & CO.
A. B. Johnson.

Electric Headlights.

Vandolia Line,
Terre Haute & Indianapolis Railroad Co.,
TERRE HAUTE, Ind., Nov. 22, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE.

About two weeks ago we placed on one of our heavy passenger engines running between Terre Haute and Indianapolis an electric headlight manufactured and sold by the National Electric Headlight Co., of Indianapolis, Ind. The apparatus consists of a combined four-cylinder engine of about three horse power and a dynamo, incased, the whole weighing about 700 lbs., and placed over the smoke arch between the headlight and smoke stack. The light is an arc, the apparatus arranged to fit into almost any headlight case and reflector. But one carbon is used, the lower point being of copper and stationary. For any further information as to the construction I would refer you to the manufacturers.

As to its performance, in the two weeks it has been in service here it has given no trouble. The only attention

required is to put in new carbons at the terminals. Only one observation of its value on the road has yet been made; this was on a very dark night with a misty rain falling. Under these conditions the white-washed fences leading to cattle guards could just be seen at a distance of three-fourths of a mile; a white car on the track would show up as an obstruction at nearly the same distance, a car of a dark color would not show plainly quite one-half of a mile; 12 telegraph poles can be plainly seen; a white mile post shows as a spot of white at a distance of half a mile; a tie at the side of track can be recognized 800 ft. ahead; the white side of an ordinary switch target shows plainly a quarter of a mile ahead; colors on an old style switch target 12 x 26 in., half white and half red, in vertical stripes, can be plainly seen at about the same distance; different kinds of stock can be recognized fully 1,000 ft. ahead. The conclusions arrived at are that except in thick fog any serious obstruction can be seen far enough ahead to stop a train equipped with air brakes going at a speed of 45 miles per hour. The track and right of way is brightly lighted back to the pilot, where the line between dark and light is distinctively drawn, opposite the cab windows the fences and telegraph poles could not be distinguished.

This is in answer to your inquiry of recent date, and I hope it will enable you to form an opinion as to the value of these powerful lamps in headlights of locomotives.

G. H. PRESCOTT, Supt. M. P. & M.

The Stroudley Driver Brake.

33 Broadway, N. Y., Nov. 20, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your illustration in a late issue of the *Railroad Gazette* of the "clasp" or "squeeze" driver brake shown at the Paris Exposition and used upon the London, Brighton & South Coast Railway is interesting, indicating as it does the desire to conform to the true principle of applying brake power to the wheels of a locomotive; which principle was confirmed by the Committee on Driver Brakes at the last Master Mechanics' Convention at Niagara Falls, viz., that all locomotive brakes should be "squeeze" brakes.

Although there is nothing new in the application of brakes to the wheels of a locomotive by separate and independent cylinders immediately behind them, the combination of a brake-shoe lever, with a separate cylinder for each wheel, is new. The brake shows, also, much neatness of design. The combination of the ball and socket joint with the "take-up" is very neatly arranged. It would have been still more interesting if some idea of the effectiveness of the brake had been given, which, after all, is what is really required of a brake.

Judging from the dimensions shown upon the face of the illustrations, the engine must have been very light or the pressure used must have been much in excess of that in general use upon American engines. With a 5-in. cylinder, such as is shown, with standard air pressure of 70 lbs., and levers arranged as in the illustration, the pressure given to each shoe is but 1,710 lbs., or less than 1½ tons to a wheel. This would make a very poor showing upon most of the engines in this country, very few of which require less than five tons to a wheel for effective braking. To accomplish this with the brake you illustrate would necessitate an 8-in. cylinder for each wheel, and the dimensions of the pull rods would have to be increased; and, seeing that these rods are double, running both inside and outside the wheels, there would, with so large a cylinder, be danger of contact with the coupling rods of the engine.

It is doubtful if such a brake could ever become a favorite in this country. The necessity of constructing a separate cylinder and air-pipe connection for each wheel upon, say, a consolidation engine, involving eight cylinders and eight connections, would hardly commend itself to a mechanical engineer, when it can be more neatly and effectively done with one cylinder, or at most two cylinders, and a single inside line of pull rods to all the wheels.

In any case a driver brake worked by air is a mistake. The margin of safety placed in the hands of the engineer who has a steam brake upon his engine, to fall back upon if the air should fail, outweighs all other considerations.

JAS. HOWARD.

The Over-Supply of Freight Cars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your editorial on my article on the subject of "Car Service Reform," published Nov. 15, throws out some ideas that should be further considered. After crediting Mr. Marony and others with bringing out the fact "that if all our cars were loaded and ready to move (as they ought to be) we should not have engines enough to haul them," you add: "But we need not worry much over this, for the money now spent in renewal of freight cars can readily be turned to providing new locomotives as fast as the use of cars for storehouses is abolished." Closer reasoning, I think, would have led you to the more logical conclusion that the money now spent in renewal of freight cars and of locomotives can readily be turned to providing new storehouses. It is certain that, under an ordinarily fair movement, no more cars are required to move the present rail tonnage of the country, even in the busiest seasons; and I am of the opinion that an increased movement per car per day

would not make the purchase of new locomotives necessary by those roads which have sufficient power to handle their business under present conditions. If all our cars were "loaded and ready to move" more locomotives would be required; but the fact should be kept in view that, in order to increase the general average movement per car per day, with the same amount of tonnage, the number of cars in service must be decreased, and consequently the number of loaded cars to be moved within certain periods of time would not, perhaps, be as great as at present, and with an increased performance per car actually less locomotives would be required.

To the close and intelligent observer it must at once be plain that, aside from their actual cost, an overproduction of freight cars is one of the most expensive items connected with the operation of railroads. The motive power of a railroad is generally supplied on the basis of the maximum tonnage that it will be required to move at any period of the year. If then it can be shown that an overproduction of cars results in placing the maximum tonnage mark higher than the necessities of trade require, it will follow that the supply of locomotives and side tracks is beyond the actual requirements. I believe this to be the case at the present time, and that it is one of the most important factors to be considered when contemplating the necessity of reform of the car service.

In reply to a recent letter I addressed to him on the question of car supply and demand, Mr. S. M. Prevost, General Superintendent of Transportation of the Pennsylvania, said: "In order to determine as to whether there is an actual shortage of cars one must become somewhat familiar with the amount of tonnage of any particular commodity the various markets are prepared to absorb." This is the true test. If the motive power of a road is adequate to supply tonnage to the markets it serves as fast as they are prepared to absorb it, it is sufficient for all practical purposes; but if the motive power is sufficient to supply its markets in 30 days with more tonnage than they can absorb in 90 days, it is beyond the actual requirements, and in consequence the whole operating service is also influenced to assume greater proportions than the actual business handled should require. That there is an overproduction of cars producing just such effects, especially on the trunk lines, at the present time there cannot be much doubt. As Mr. Horton says, there are immense crops in the West to be marketed. The farmer must have money, and his chief aim is to get his product into the cars, that he may draw the cash on his bill of lading. The market is not ready to absorb the product, but, nevertheless, into the cars it goes with a rush, and for a spell business on the road "booms." Shipments of coal, lumber and other products come under the same general rule and aggravate the situation.

To the superabundance of cars to carry the tonnage into the markets as they absorb it may be directly attributed the growth of the practice of billing shipments in cars "to order" instead of holding in the warehouse, elevator or storage grounds until the markets are prepared to absorb the commodity. This leads me to notice your comment on Mr. Blakeslee's proposition that the traffic department should stop the billing "to order" system. You say "the traffickers cannot do this if they would," but your reasoning for such a conclusion is not very convincing. It may be true, as you say, "that in many cases they do not wish to," and I have no evidence to the contrary; but this does not signify that they could not do it if they would. The traffic departments, with some exceptions, have been credited with opposition to the demurrage system, but if they would co-operate with the operating departments in bringing about the general adoption of the rule to charge \$1 per car per day for use of car and track after 48 hours from date of arrival, the billing to order system, or its bad effects, would be early disposed of. Neither grain nor coal can stand a storage charge of \$1 per car per day for any length of time, and the natural effect of the rule would be to hold the shipments at starting points until prompt discharge from car at destination is assured.

As I look at the car service problem, the principal factors to be considered in reaching a satisfactory solution are:

1. That the money circulation and conditions of trade require the producer to turn his products into money quickly.
2. That the products of the soil and the forest constitute the bulk of traffic which is ready for shipment during the fall months; the one being controlled by season and harvest, and the other by the economy of prosecuting the work during the summer months.
3. The immensity of the traffic offered during these months, and the difficulty of handling it at the seaboard points, the producing territory being so vast and the seaboard business centres and terminals so few.
4. The enormous outlay required to provide enough power and cars to move this immense traffic when crowded into a few months of the year.
5. The storing of surplus motive power and cars during other periods of the year.

A warehouse or storage certificate is or could be made just as available for putting cash into the hands of the producer as the present bill of lading furnished for shipments loaded into cars, and shipments could be graduated somewhat with reference to the actual capacity of the markets to absorb.

I have written from an operating standpoint, but hav-

ing in full view the present methods of competition, which appear to be based on the idea that the freight car fills the office of a sort of missionary, and the more there are of them scattered throughout the country the more business is secured for their owners; and I might add, that the more this idea is cultivated the more complicated will become the car service problem.

W. G. WATSON.

The Arrangement of Interlocked Signals.

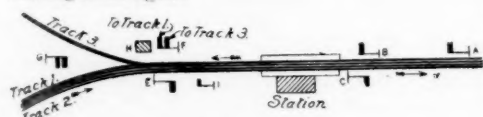
PITTSBURGH, Nov. 9, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

As a member of the Signal Committee of the Pennsylvania lines west of Pittsburgh, it will, perhaps, not be deemed improper for me to attempt to explain the so-called "novel" points of our method of signaling, referred to by P. S. E. in your issue of Nov. 8.

First, as to the auxiliary home signal: The committee started out by admitting the principle that all positive signals were home signals, and interpreting positive signals to mean such signals as brought trains to a stop under them. Home signals are usually placed at a point where tracks diverge, or where tracks cross, but frequently a section of track back of this point should receive protection; as at a station, or, to admit of back-up movements from the diverging track onto the main line. In most cases it would not do for the principal home or route signal to be located this far back of the junction, and, in order to protect the track, an auxiliary to the home signal is there placed; "auxiliary" because it assists the home signal to let trains up to and over the junction or crossing; and "home," because it is a positive signal to stop when the semaphore is horizontal.

P. S. E. wholly misunderstands the meaning of the term "starting-home" signal. At many places where tracks converge the station is placed some distance beyond the junction point. The interlocking tower, for convenience in operating, is placed as near as possible to the switches. It is often advisable to let trains pass the junction and to the station to receive and discharge, when they could not be allowed to pass on to the station beyond. In this case a signal is placed at the end of the platform farthest from the tower, so that trains doing station work stand in front of it; this signal we call a starting-home signal.



The above diagram, taken from an actual arrangement of tracks and signals, illustrates the auxiliary home and starting-home signals. In it B is an auxiliary home and C a starting-home signal. "Starting," because it is used to start trains and not to indicate the position of switches, and "home," because it is used for a positive stop.

When semaphore blades indicate routes open to tracks from right to left, according to the blade's position from top to bottom on the mast, it is found necessary by some means to emphasize the blade for the high-speed route; this has been accomplished in the day signal by making the proper arm longer than the rest, but at night nothing satisfactory has been devised to accomplish this result.

The best means of emphasizing both by day and night is the relative position the blade occupies on the mast; hence the adoption of the top arm for this route; nor is this a departure from what is recognized as good practice, as very many roads, even those which use the multiple arm, and right to left from top to bottom system, put the high-speed blade at the top of the column, regardless of the direction of the route, and confine the placing of the blades in positions relative to the tracks to the side movements.

More than two blades on a mast become dangerous at night, especially when the number is great, for the extinguishing, accidentally, of one light affects the relative position of all below it. Cases are known of a false reading from this cause. Where two blades only are used, it is easy to see, under all conditions, whether both are there, and the absence of one is much more easily detected. There are only two meanings necessary to be conveyed by a home signal in its safety position—one is to come ahead at full speed, and the other to come ahead but look out where you are placed. Ordinarily at interlocked switches, trainmen have no option as to where their trains are put, and it is usually necessary only to tell them whether they are, or are not, to go to the high-speed route. When other information is necessary, the indicator answers the purpose admirably, and the low speed required by the lower blade gives ample time to readily read the indicator number.

A distant signal is used to indicate the position of the home signal, and it should not be placed so near the home signal as to make the information it conveys too late to stop the train before the home signal is reached; nor so far as to render it probable that the home signal will be reversed after the distant signal is passed at safety. Hence the minimum and maximum distances; and, hence, also, the requirement that they be placed within sight of the signalman. A fixed distance cannot be made that will, in all cases, make it possible to conform to the three requirements, but, with the latitude given, they can nearly always be met; when they cannot, then sacrifice the least important of them.

No inconsistency can result from the regulation that a distant signal shall not be placed within a given distance of a home signal of a tower in the rear, because this given distance, plus the minimum distance of a distant to a home signal, is so small that towers placed thus close would be located only in yards where distant signals are not required at all. The regulations plainly state that movements on tracks in the reverse direction shall be controlled by low semaphores. Movements in the reverse direction are back-up movements; these were illustrated in enough of the diagrams to illustrate the manner of their use, and the rest were not burdened with them.

COMMITTEEMAN.

SAVANNAH, Ga., Nov. 20, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have been reading your Buffalo correspondent's comments and your editorial on the Pennsylvania Company's block and interlocking rules in your issue of Nov. 8. While we should at all times give proper consideration to those standards and customs arrived at on the English railroads by long and often bitter experience, we should be somewhat reassured by the fact that most of the departures from English practice in signaling have been introduced by men who from the commencement of that now important railroad department have been thoroughly schooled in the art.

As regards the English method of signaling for diverging routes from a main line, it will possibly be news to many American engineers to know that until quite recently the signal arms for diverging tracks were often carried by two or more posts, and those for converging tracks were just as often carried by one post, although the general practice was the reverse in both cases. The Pennsylvania Company's decision to use as standard a large top arm for the main line, and a small lower arm with route numbers for less important diverging lines is, I believe, commended by nearly all responsible signal engineers. I presume, however, that the Pennsylvania Company will not use the system for fast diverging main lines, where both are of equal importance.

As regards backing-up signals, I may say that the English railroads do not go in nearly as much as we do for signaling all movements, the signals for many shifting movements being given from the tower by flag, lamp or whistle. The siding signals sent here by Saxby & Farmer were pot signals. We have made a decided improvement, I think, over that method by substituting the dwarf semaphore, which is now generally used for sidings.

The fact of having so many interlocking towers not connected with the block obliges us to depart in some instances from what is proper practice in England.

ARTHUR H. JOHNSON.

Comparative Fuel Consumption and Designs of Compound Locomotives Royal Saxon State Railroads.

II.

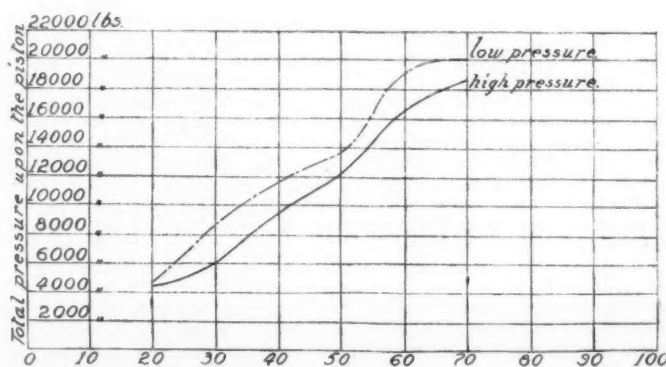
The indicator cards, Nos. 63 to 65, Table II., show the variation of pressure in the receiver. The experience with these compound locomotives show the maintenance to be in no way increased or to contrast unfavorably with the ordinary locomotives. The fire boxes and tube settings, in consequence of the more regular fires and milder draft, are less strained. The steam valves in the steam chests, in consequence of the less pressure thereon, have considerably less wear, and there is also, for similar reasons, less leakage of the steam pistons. The locomotives made compound have been delivered to the ordinary engineers without special instructions, and after having been in service the usual length of time—which is until the giving out of some of the working parts—have shown no increased deterioration, and it may be firmly stated that the cost of maintaining these compound locomotives is in no wise higher than those of the ordinary locomotives, and possibly in the end will prove more economical to support than the ordinary form.

With an express compound locomotive using the Lindner apparatus, experiments to show the braking power of the cylinders on inclines were conducted by the reversing of the valve motion and the introduction of counter steam pressure. To accomplish this, a compound locomotive standing under steam was drawn by a freight locomotive, and as soon as the desired speed was reached—18.6 miles per hour—the distributing

valve motion was reversed, hot water was admitted to the low-pressure exhaust pipes, counter steam introduced, and the locomotive in this state pulled 4,900 to 9,800 ft. farther. The pull of the drawing locomotive amounted to 8,800 to 9,900 lbs., and the notes taken at the time show the excellent brake action by the cylinders, which prove to be only slightly greater for the low-pressure cylinder than the high-pressure cylinder. The heat in the low-pressure cylinder was raised from 140 to 145 degrees Centigrade (284 to 293 degrees Fahrenheit), and in the high-pressure cylinders 175 to 180 degrees Centigrade (347 to 356 degrees Fahrenheit). The safety valve on the receiver, as before mentioned, blew off a large amount of the heated gas, and the blowing off of the safety valve on the boiler relieved almost entirely the pressure therein. After stopping the experiment, the piston rods proved to be no warmer than when driven with steam, and the stuffing boxes, with soft lead packing, were completely uninjured. Examination of the steam valves and pistons after the trial showed the surfaces of the cylinders, pistons and valve seats to be absolutely uninjured. A further trial was made for the proof that in the case of necessity one may drive the compound locomotives with one cylinder the same as with the ordinary locomotive. It was found that the driving of each cylinder singly was possible, as soon as the steam valve in the disabled cylinder was blocked in a position so that the steam could go directly from the slide box to the exit channel.

The distribution of the work between the two cylinders is an interesting feature of these engines, and fig. 6 shows graphically the difference in the average crank-pin pressure on the high-pressure and low-pressure side of this class of engine when the ratio of the cylinder volumes is 1 to 1 to 2½. The figures on the left hand side of the diagram give the pressure in pounds. On the bottom of the diagram the percentage of cut-off. The dotted lines show the average number of pounds pressure on the crank pin for each different cut-off in the low-pressure cylinder; the full line the average number of pounds pressure on the crank pin for the high-pressure cylinder. It will be noticed that the low-pressure cylinder at low speeds has a little more power than the high-pressure cylinder. At high speeds this diagram would be considerably modified, and it is this modification which must be carefully considered when designing compound engines for different services. The principal cause of the modification lies in the wire drawing, and a careful estimate of the amount of wire drawing which will take place with a proposed valve gear is one of the most essential elements connected with a determination of the proportions of the cylinders and the arrangement of the valve gear on compound locomotives. Diagrams such as this will be different for every different speed for which they are determined, and it is not to be inferred that a good diagram at slow speeds indicates that an equally good diagram will be made at high speeds. The indicator diagrams, Nos. 1 to 62, Table II., were taken from compound locomotives of this type. In determining the work per revolution, the mean effective pressure used was the average of that found at both ends of each cylinder; that is, the mean effective pressure was taken at both ends of each cylinder, and these results were added together and divided by two. The result is the average mean effective pressure per revolution, and was that used in calculating the work done.

The economy in coal consumption by the compound locomotive in contrast with that of the ordinary locomotive in the same service and upon the same line is shown in the Table III. The comparison of the coal demands are only taken for such locomotives which have the same service, and for the same months of the year, as all locomotives were not regularly run in the same service for the whole year, and the effect in economy is too variable at different seasons to allow the comparison. Also to be noticed are the effects for quarters of a year which give less regular results, as in that length of time the influence of the measurements of coal, switching of the trains, and the variations of freight, together with the weather and accidental variations, is too great. Careful trials during one week with accurate measurements of the water and coal show equally favorable results, but the influence of different engine drivers, the weather, the variations in coal, and accidents are too great to allow accuracy in the results from such small journeys, and it is hardly just to decide upon the merits of the compound from such tests. The re-



Comparative Average Crank Pin Pressures—Compound Express Locomotive, Royal Saxon State Railroads.

TABLE III.—COMPARATIVE COAL CONSUMPTION, COMPOUND AND ORDINARY LOCOMOTIVES, ROYAL SAXON STATE RAILROADS.

DURATION OF TESTS.	Road number of locomotive.	Type of locomotive.	Steam pressure, pounds per square inch.	Axle mileage of locomotive.	Locomotive mileage, including an allowance for time of delays during service.	Coal used, including that for empty journey, reckoned at 17.5 lbs. per mile, for reserved service at 33 lbs. per hour, and for delayed service at 93½ lbs. per hour.				Coal used, not including the demands for empty journey, reckoned at 17.5 lbs. per mile, for reserved service reckoned at 33 lbs. per hour, and for delayed service reckoned at 93½ lbs. per hour.				Number of axle miles per locomotive mile, and what is equivalent thereto the average number of axles in train.			
						Total coal used, lbs.	Total for locomotive mile.	Proportional number per axle mile.	Total per wagon axle mile.	Proportional number per axle mile.	Actual mileage of locomotive.	Total coal used, lbs.	Coal per locomotive mile.		Proportional number per wagon axle mile.	Proportional number per axle mile.	
1887—January to March and October to December.	734 735 96, 163, 171, 172, 174	Express compound. Express non-compound. Express non-compound.	176.4 154.4 125.0	253,394 326,444 391,841	16,728 29,739 35,398	442,200 636,350 377,900	25.9 30.1 27.7	93.7 108.8 100.	1.7 1.9 1.9	92.2 103.8 100.	14,984 19,643 12,153	415,305 610,504 350,044	27.3 31.5 29.1	98.8 108.5 100.	1.6 1.9 1.8	91.2 104.9 100.	17.0 17.1 16.6
1887—April to September.	734 735 96, 163, 171, 172, 174	Express compound. Express non-compound. Express non-compound.	176.4 154.4 125.0	353,325 372,880 322,674	19,078 14,761 17,940	440,000 429,000 483,780	22.5 28.7 26.6	85.4 104.9 100.	1.2 1.5 1.5	88.1 107.3 100.	17,571 13,633 16,263	416,510 411,719 457,635	23.5 29.8 27.7	84.2 107.3 100.	1.2 1.5 1.4	83.1 106.4 100.	20.1 20.0 19.8
1887—January to December.	734 735 96, 163, 171, 172, 174	Express compound. Express non-compound. Express non-compound.	176.4 154.4 125.0	608,719 70,925 324,015	35,825 35,500 31,338	882,200 1,065,350 861,740	24.2 29.8 27.0	89.6 109.1 100.	1.4 1.8 1.6	88.1 108.9 100.	32,556 32,676 28,417	831,815 1,022,223 816,679	25.2 30.8 28.4	88.9 108.9 100.	1.4 1.7 1.5	87.7 109.4 100.	18.1 18.3 18.4
1888—January to June.	734 735 96, 163, 171, 172, 174	Express compound. Express non-compound. Express non-compound.	176.4 154.4 125.0	254,855 225,055 237,336	14,941 18,776 15,164	365,200 451,000 447,150	24.2 32.2 29.1	82.3 111. 100.	1.4 2.0 1.9	76.0 106.4 100.	13,700 12,608 13,695	346,214 433,142 424,589	24.9 34.0 30.5	81.5 110.8 100.	1.3 1.9 1.8	75.9 107.6 100.	18.6 17.8 17.3
1887 and 1888—January, 1887, to June, 1888.	734 735 96, 163, 171, 172, 174	Express compound. Express non-compound. Express non-compound.	176.4 154.4 125.0	863,574 24,380 761,351	50,767 49,276 46,592	1,247,400 1,516,850 1,398,890	24.2 30.5 27.7	87.6 109.7 100.	1.4 1.8 1.7	84.0 107.0 100.0	46,206 45,285 42,113	1,178,029 1,455,366 1,241,268	25.2 31.9 29.1	86.4 109.0 100.	1.3 1.8 1.6	83.7 108.8 100.	18.1 18.2 18.1
July to September, 1888.	546, 618, 623, 734, 764 to 766	Express compound.	176.4	217,391	10,099	239,050	24.2	90.6	1.2	79.5	9,539	241,846	24.9	90.1	1.1	78.4	22.8
April to September, 1887.	96, 163, 171, 172, 174	Express non-compound.	125.0	322,674	17,940	483,780	26.6	100.	1.5	100.	16,263	457,635	27.7	100.	1.4	100.	19.8
1887—January to March and October to December.	736 737 465, 466, 468, 472 738, 739	Freight compound. Freight non-compound. Freight non-compound. Freight non-compound.	176.4 176.4 125.0 132.3	414,531 249,778 367,513 435,558	8,715 5,589 11,888 9,219	327,800 272,800 190,825 442,585	35.1 30.4 46.9 47.3	79.4 103.4 100. 101.3	0.8 1.1 1.0 1.0	75.8 104.7 100. 97.4	6,773 4,426 9,191 7,308	296,191 254,819 519,523 412,709	43.1 36.7 55.7 55.7	97.7 101.9 100. 99.9	0.7 1.0 0.9 0.9	73.9 105.5 100. 98.0	61.2 56.4 58.5 59.6
1887—April to September.	39, 51, 236 242, 337 754 to 758	Freight compound. Freight non-compound. Freight non-compound. Freight non-compound.	176.4 176.4 125.0 132.3	91,433 560,867 464,639 417,826	1,924 11,855 9,565 8,813	72,226 445,720 473,220 418,138	37.1 37.1 41.0 43.1	85.8 86.1 94.8 96.1	0.8 0.8 0.8 0.9	87.8 88.4 93.8 98.5	1,492 9,415 9,140 7,637	65,494 406,630 437,822 388,236	43.4 42.7 47.3 50.1	86.3 97.7 94.3 100.	0.7 0.7 0.8 0.8	85.8 86.9 93.5 100.0	61.2 59.5 61.4 60.8
1887—January to December.	736 737 465, 466, 468, 472 738, 739	Freight compound. Freight non-compound. Freight non-compound. Freight non-compound.	176.4 176.4 125.0 132.3	975,004 510,644 1,092,102 853,484	20,551 16,984 21,397 18,081	773,520 746,020 978,979 812,953	37.1 43.4 45.2 44.5	82.3 96. 100. 98.5	0.8 0.9 1.0 0.9	81.2 94.2 100. 97.5	16,189 13,566 16,828 14,267	702,761 692,641 907,559 759,794	42.7 50.4 53.2 52.2	80.7 94.7 100. 98.0	0.7 0.8 0.9 0.9	79.6 94.4 100.0 97.5	60.2 59.8 59.6 59.8
1888—January to June.	39, 51, 236 242, 337 754 to 758	Freight compound.	176.4	486,461	10,604	395,241	36.8	84.3	0.8	82.9	8,590	302,912	42.2	83.6	0.7	81.7	57.0
1887 and 1888—January, 1887, to June, 1888.	465, 466, 468, 472 738, 739	Freight non-compound. Freight non-compound.	176.4 125.0	435,316 386,344	9,965 11,899	476,520 525,825	47.6 48.8	108.9 100.	1.1 1.0	111.7 100.	7,640 9,690	440,941 480,792	50.1 50.1	113.5 100.	1.0 0.9	110.9 100.	57.0 55.7
January, 1887, to June, 1888.	39, 51, 236 242, 337 754 to 758	Freight compound.	176.4	849,511	18,888	698,401	37.5	84.3	0.8	84.1	14,589	639,804	43.4	83.0	0.7	82.9	58.2
	465, 466, 468, 472 738, 739	Freight non-compound. Freight non-compound.	176.4 125.0	1,167,900 1,245,999 1,588,506 1,125,947	24,808 26,889 33,296 24,924	945,120 1,222,540 1,504,802 1,101,980	37.5 44.8 44.5 45.2	84.3 100.6 100. 101.5	0.8 1.0 1.0 1.0	82.7 100.3 100. 100.1	19,694 26,459 19,008	862,048 1,133,583 1,397,552 1,022,883	43.1 52.9 52.2 53.2	82.9 101.2 100. 101.9	0.7 0.9 0.9 0.9	81.3 100.2 100. 100.	59.3 58.8 58.1 59.2

TABLE II.—PARTICULARS RELATING TO INDICATOR CARDS, COMPOUND EXPRESS LOCOMOTIVE ROYAL SAXON STATE RAILROADS.

Number of diagram.	Scale.	High or low pressure.	Front or back end	Boiler pressure—lbs. per square inch.	Revolutions per minute.	Percentage of cut-off.	Mean effective pressure—lbs. per square inch.	Work shown by each card—average foot lbs. per stroke.	Speed in miles per hour.	Ratio of cylinder volumes.	Road No. locomotive.	Remarks.
1.	A	H	F	168	20	20.59	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
2.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
3.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
4.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
5.	A	H	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
6.	A	H	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
7.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
8.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
9.	A	H	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
10.	A	H	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
11.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
12.	A	L	F	168	20	21.33	8.238	12.40	12.40	735	Express compound locomotive "Cairo."	
13.	A	H	F	171	50	57.18	22.630	24.80	24.80	735	Express compound locomotive "Cairo."	
14.	A	H	F	171	50	57.18	22.630	24.80	24.80	735	Express compound locomotive "Cairo."	
15.	A	L	F	171	50	57.18	22.630	24.80	24.80	735	Express compound locomotive "Cairo."	
16.	A	L	F	171	50	57.18	22.630	24.80	24.80	735	Express compound locomotive "Cairo."	
17.	A	H	F	156½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
18.	A	H	F	156½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
19.	A	L	F	156½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
20.	A	L	F	156½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
21.	A	H	F	161	70	86.66	33.880	35.410	35.410	735	Express compound locomotive "Cairo."	
22.	A	H	F	161	70	86.66	33.880	35.410	35.410	735	Express compound locomotive "Cairo."	
23.	A	L	F	161	70	86.66	33.880	35.410	35.410	735	Express compound locomotive "Cairo."	
24.	A	L	F	161	70	86.66	33.880	35.410	35.410	735	Express compound locomotive "Cairo."	
25.	A	H	F	168	80	38.12	15.140	19.80	19.80	735	Express compound locomotive "Cairo."	
26.	A	H	F	168	80	38.12	15.140	19.80	19.80	735	Express compound locomotive "Cairo."	
27.	A	L	F	168	80	38.12	15.140	19.80	19.80	735	Express compound locomotive "Cairo."	
28.	A	L	F	168	80	38.12	15.140	19.80	19.80	735	Express compound locomotive "Cairo."	
29.	A	H	F	168	80	38.12	15.140	19.80	19.80	735	Express compound locomotive "Cairo."	
30.	A	H	F	168	80	38.12	15.140	19.80	19.80	735	Express compound locomotive "Cairo."	
31.	A	L	F	159½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
32.	A	L	F	159½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
33.	A	L	F	159½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
34.	A	L	F	159½	60	77.66	30.720	18.60	18.60	735	Express compound locomotive "Cairo."	
35.	A	H	F	118	50	50.04	22.430	25.330	25.330	735	Express compound locomotive "Cairo."	
36.	A	L	F	118	50	50.04	22.430	25.330	25.330	735	Express compound locomotive "Cairo."	
37.	A	L	F	118	50	50.04	22.430	25.330	25.330	735	Express compound locomotive "Cairo."	
38.	A	L	F	118	50	50.04	22.430	25.330	25.330	735	Express compound locomotive "Cairo."	
39.	A	H	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
40.	A	H	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
41.	A	L	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
42.	A	L	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
43.	A	H	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
44.	A	H	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
45.	A	L	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
46.	A	L	F	171	70	88.48	34.310	31.840	31.840	735	Express compound locomotive "Cairo."	
47.	B	H	F	114	60	73.96	24.8	24.8	24.8	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
48.	B	H	F	114	60	73.96	24.8	24.8	24.8	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
49.	D	L	F	114	60	73.96	24.8	24.8	24.8	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
50.	D	L	F	114	60	73.96	24.8	24.8	24.8	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
51.	B	H	F	168	158	40	37.55	32.70	32.70	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
52.	B	H	F	168	158	40	37.55	32.70	32.70	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
53.	D	L	F	168	158	40	37.55	32.70	32.70	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
54.	D	L	F	168	158	40	37.55	32.70	32.70	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
55.	B	H	F	171	100	66	69.98	16.10	16.10	736	Compound freight locomotive "Kanzli," equal cut-offs in both cylinders.	
56.	B	H	F	171	100	66	69.98	16.10	16.10	736	Compound freight locomotive "Kanzli," equal cut-offs in both cylinders.	
57.	L	L	F	163½	49	48.07	35.84	35.84	35.84	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
58.	D	H	F	163½	49	48.07	35.84	35.84	35.84	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
59.	B	H	F	163½	49	48.07	35.84	35.84	35.84	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
60.	B	H	F	163½	49	48.07	35.84	35.84	35.84	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
61.	D	L	F	171	85	50.73	21.91	21.91	21.91	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
62.	D	L	F	171	85	50.73	21.91	21.91	21.91	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
63.	D	L	F	171	85	50.73	21.91	21.91	21.91	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
64.	D	L	F	171	85	50.73	21.91	21.91	21.91	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
65.	D	L	F	171	85	50.73	21.91	21.91	21.91	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	
66.	D	L	F	171	85	50.73	21.91	21.91	21.91	734	Express compound locomotive "Africa," equal cut-offs in both cylinders. With bow pipe in boiler steam space.	

with the same service of the compound locomotive, and the standard price for coal of 12 marks (\$3) per ton, amounts to, for an express compound locomotive with a yearly mileage of 34,100 miles, 925 $\frac{1}{2}$ marks (about \$231.30), and in a freight compound locomotive, with a year's performance of 19,220 miles, to about \$239.30.

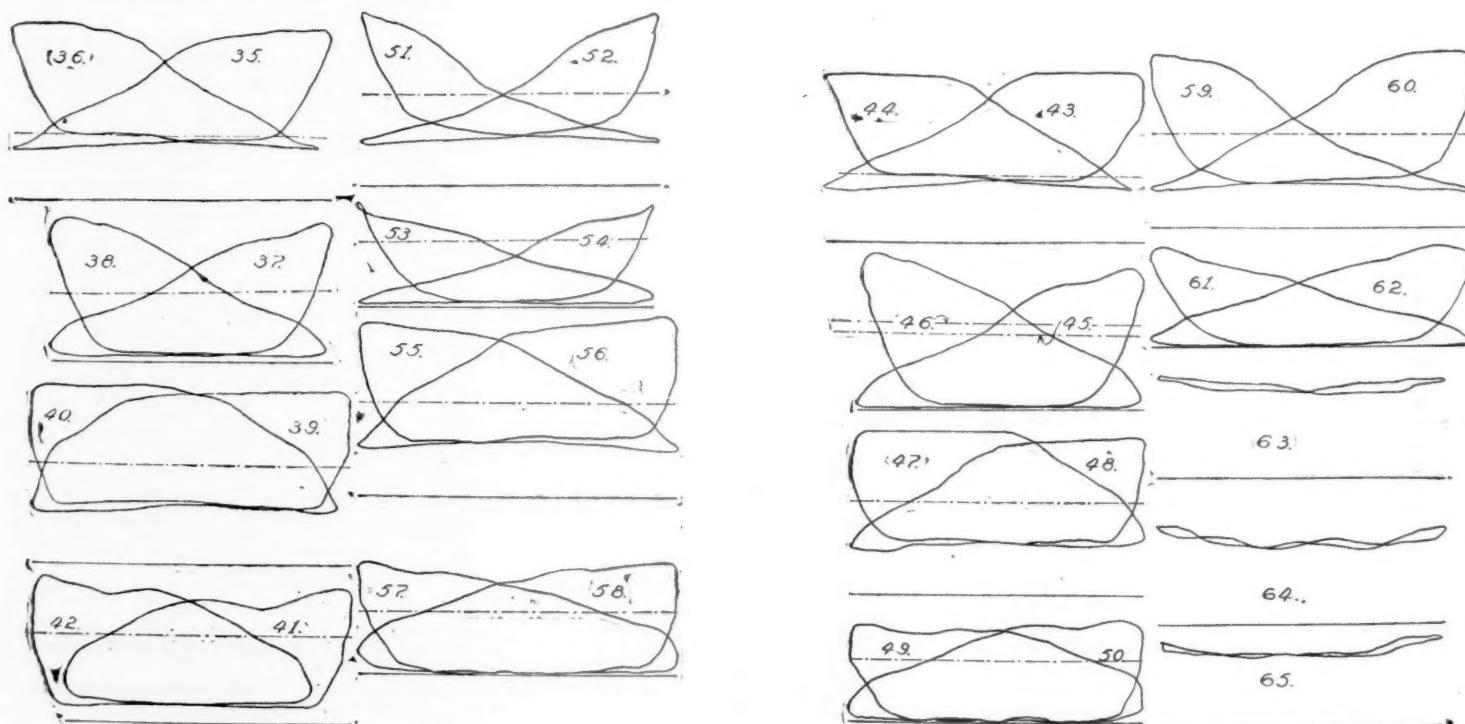
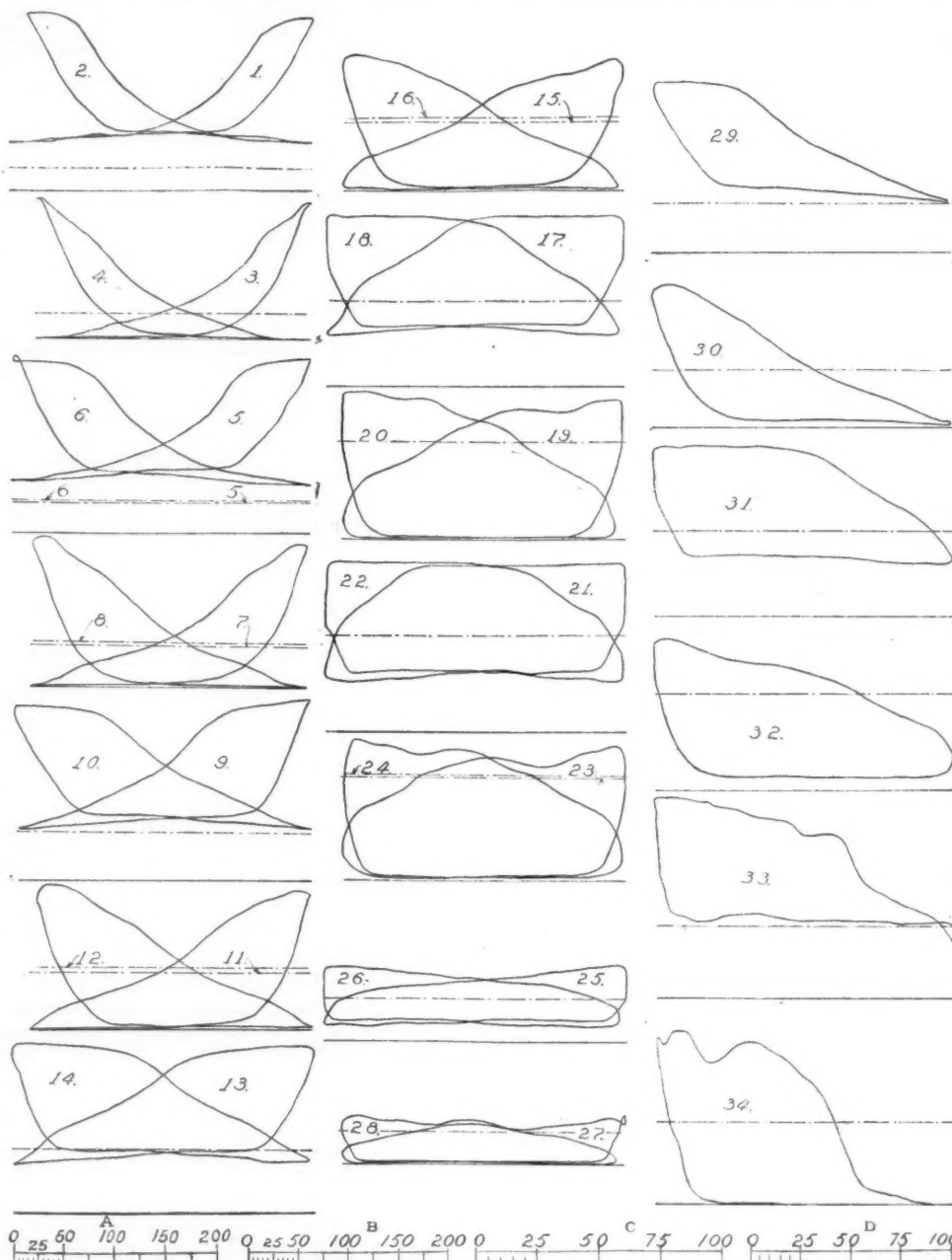
An American Academy of Engineering.

One of the effects of the European trip of the American engineers during the past season was the growth among the members of the party of a feeling that there should be some closer bond of union between the four organizations whose representatives thus became thoroughly acquainted with each other, many of them meeting for the first time. The first official step in such a movement was taken by the American Society of Mechanical Engineers at their recent meeting in this city, where Mr. Henry R. Towne, retiring President, offered a series of resolutions authorizing the appointment by the Council of a committee of three to confer with similar committees of the Civil, Mining and Electrical Engineers' societies, looking to the formation of a national engineering society.

In the ensuing discussion it was clearly stated that no amalgamation was intended, and that nothing was to be done that should interfere with the autonomy of the existing societies; that it was the intention to move toward the formation of a national association that should embrace the highest talent of such societies. It was explained that our conception of the term "civil engineer" was wrong; that it was adopted in Europe originally merely to distinguish engineers in civil life from those in government employ, and that the British Institution of Civil Engineers embraces in fact engineers of all classes, several of its presidents having been mechanical engineers.

But there are apparent obstacles to be overcome in the foundation of an organization such as is suggested by Mr. Towne. The growth of a society is usually gradual, and although it may speedily obtain members, it cannot at once acquire dignity, experience, and age. If it is to embrace the best engineering talent of the country, how is such a membership to be acquired? If it is not to interfere with the work of existing societies, where will its field be found? These questions I propose to answer, and if the idea is novel, it must be remembered that the conditions are peculiar. Mr. Kent, in a paper before the American Association for the Advancement of Science in 1886, proposed an Academy of Engineering, and I have taken the liberty of using that title for the purpose of outlining the plan of organization.

Let the Committee of Conference report in favor of the establishment of an Academy of Engineering. Instead of permitting the election of members in the ordinary manner, let the existing societies be requested to name, say, 10 per cent. of their members for admission to the academy. This would give roughly 120 members from the Civil, 100 from the Mechanical, 200 from the Mining and 40 from the Electrical Engineers, a total of 460. In order to make this selection, let the plan be pursued of



INDICATOR DIAGRAMS, COMPOUND LOCOMOTIVES OF THE ROYAL SAXON STATE RAILROADS.

obtaining from each member a list of the candidates he considers eligible for advancement to the academy, which would be 120 in the case of the American Society of Civil Engineers. When these lists are received, let the candidates receiving the highest number of votes be selected for admission to the academy. This would furnish

a suitable membership at the outset, and this membership could proceed to organize in the usual manner. In order to preserve the rights of all societies in the management, the Supreme Council, as we may term it, should be composed of a certain number of representatives from each society, and the president might be

selected from each in turn, beginning with the oldest society. The Supreme Council should have power to admit the members of other engineering bodies, such as architects and gas or hydraulic engineers, provided they were properly organized. This would be more essential on account of the peculiar fields in which the

Academy of Engineering is to labor, which may be termed municipal engineering or public works. Every city has continually under consideration engineering problems of various degrees of complexity. Take, for instance, such questions as bridges and tunnels, underground railroads, street openings, cable and electric street railroads, boiler and elevator inspection, building regulations, sites for public buildings, fire protection, water supply and various other matters which are handled by writers on the public press for lack of any other agency. These gentlemen, however well they may be versed in the King's English and in American politics, do not claim to be posted in engineering, although they are compelled to do the best they can. They would no doubt be willing to transfer the responsibility to other hands. It will be seen at once that an organization of this kind would be made up of exactly the material to discuss these important questions, and they could be taken up while fresh in the public mind. Papers and discussions of this nature would be widely published, and it is probable that eventually chapters of such an academy would lead to similar work in other cities. This is in brief the plan of organization, and its field of operation.

Some of its advantages would be as follows:

It could be quickly organized. It would raise the standard of engineering. It would lead to public recognition of the importance of the profession. It would eventually lead to improvements in our streets and all branches of municipal service. It would lead to better papers and discussions in our meetings, for the reason that, through making their qualifications known, members would show their claims to transfer. It would strengthen existing societies, for only through them could academic honors be obtained. It would eventually lead to the erection of an engineers' building, and the formation of a technical library that would be a credit to the country. It would concentrate in one body the prestige of existing organizations without diminishing their present importance.

There are various details in connection with such an organization which it is unnecessary to mention at this time. That of finance is the most important, and is perhaps a more delicate matter than usual in this plan, for the reason that the membership is involuntary. The membership seeks the man, instead of the man seeking the membership. The dues should, however, be as high as the traffic will bear, and those who feel that they could not afford them should give way to the next in line. The transfers should be made after the annual reports of the societies are made each year, and the percentage changed according to conditions of growth. The assertion is sometimes made that anybody can become a member of our societies by making application and payment of fees. This plan appears to afford an opportunity to establish a standard of merit which is beyond question. The objection may be raised that many engineers of the highest class might not be selected for transfer by the above plan, which may not be found satisfactory in practice. It might be found preferable for existing councils to make the selections.

The leading principles of the plan are, first, a selected membership; second, the field of public engineering, embracing as it does every branch of work.

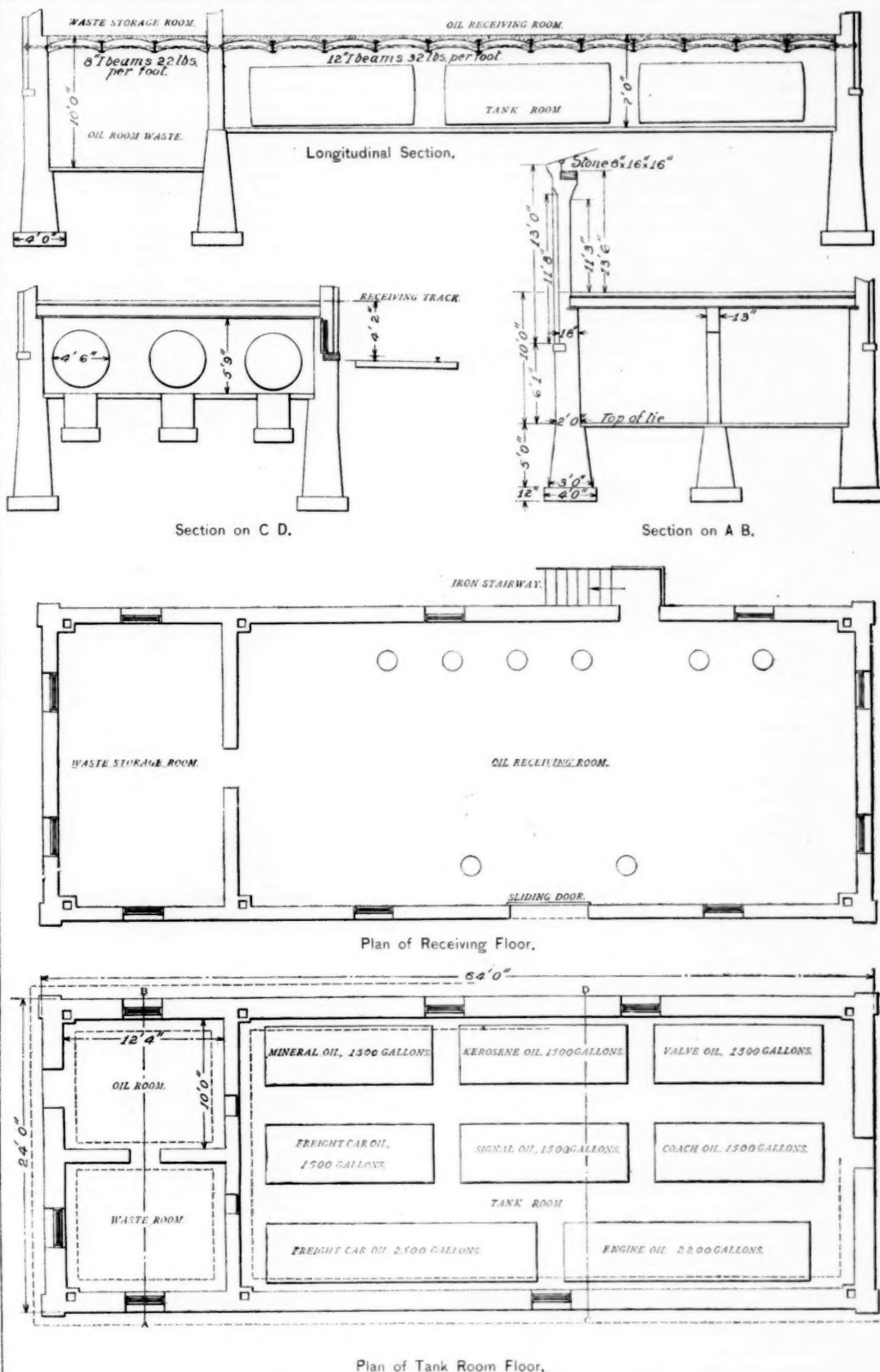
RALPH W. POPE,
Secretary of the American Institute of
Electrical Engineers.

Oil House—Minneapolis, St. Paul & Sault Ste. Marie Railway.

The accompanying plans and sections of an oil house, built by the Minneapolis, St. Paul & Sault Ste. Marie, present some novel features. In too many cases the manner of storing and handling the various oils used by a railroad is not only slovenly as regards appearance in and about the oil house, but dangerous to adjacent property, from the liability of the greasy barrels which lie about to catch fire from locomotive sparks, or other sources.

The drawings are quite complete and require but little description. The oil is brought on the cars to the receiving track shown, the barrels rolled in on the cement floor, and emptied into the proper tanks through filling holes (the connecting pipes are not shown). As fast as the barrels are emptied they are returned to the cars, the filling holes having in the meantime been closed by heavy cast-iron covers. There is also a receiving track, not shown in the drawings, on the other side of the house. This track is about 6 ft. lower and is used for receiving tank cars, from which the oil is pumped into the house tanks.

When any particular oil is wanted it is drawn from a bibb cock in the oil room, and here the arrangement is apparently perfect. On the wall next to the tanks is a series of glass columns, one for each tank, and connected to it by the necessary pipes. These columns are about 5 ft. high, with an internal diameter of about 1 in. They are mounted in the same manner as gauge glasses, each showing the level of oil in its respective tank. An indicator board back of each column is graduated in feet, inches and quarter inches, and on each division is recorded the number of gallons corresponding to that level. Thus a glance shows the exact quantity in gallons remaining in the tanks. For stock taking alone this is extremely handy.



OIL HOUSE—MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY.

The various grades of waste used are stored in tanks, and the supply is obtained in the waste room below.

As will be seen, no wood is used in the construction except for the upper window sills. All the doors and shutters are of sheet iron and the floors of cement. Absolute cleanliness in and about the building is possible and is maintained. The building is kept locked and the key can only be obtained from the storekeeper on presentation of the proper requisition.

The whole arrangement was designed by and built under the supervision of Mr. Thos. A. Fraser, the Master Mechanic, to whom we are indebted for the drawings.

Electric Train Lighting in America and Europe.

Among the numerous papers read before the International Railroad Congress recently held at Paris was a report on the use of electricity, written by E. Sartiaux, Chief Engineer to the Telegraph Department of the Northern Railroad of France, and L. Weissenbruch, Engineer to the Belgian Post and Telegraph Department. This paper treats of the present applications of electricity to railroad service under three divisions: i.e., lighting trains, lighting stations and working brakes. This is an interesting paper from a European standpoint, and has some points of interest to the railroad men

of the United States, particularly that portion referring to train lighting. The results of trials of electric lights on railroad trains in the United States are mentioned in the paper. Regarding the cost of electric lighting compared with that of gas and oil in trains, the joint authors have come to the following conclusions:

1. That the cost of electric lighting by accumulators alone, charged at fixed stations, varies in the United States from 5 centimes to 5.6 centimes with lamps of from 12 to 16 candles, and that in Europe the cost is from 1.9 to 3 centimes for lamps of from six to eight candles, per lamp-hour.

2. From experience obtained in Europe it is possible to charge accumulators by a dynamo driven off the axle at a cost not exceeding 4 or 5 centimes per lamp-hour for 5-candle lamps.

3. That in the United States the cost of lighting varies between 3.5 and 5 centimes per lamp-hour for 16-candle lamps in installations comprising accumulators, dynamos, and an engine supplied with steam from the locomotive.

On the Continent the cost of Pintsch gas per lamp-hour (five or six candles) is 3.764 centimes, and of colza oil, 5.635 centimes. It will be seen that for lights of the same candle power gas would therefore cost about 11.3 centimes per lamp-hour, and oil about 16.9, as against 5.6 for electric light; but really these deductions are based

upon too few experiments to render the comparisons reliable.

The authors further say: "It is impossible to consider the present condition of electric train-lighting without being struck with the very considerable progress that has been made in the last few years; electricity comes very near meeting the requirements of the case both as to the cost of maintenance and as to the beauty and intensity of the light. The almost entire absence of heat, the steadiness of the light, and the facility with which it can be placed at any desired point of a car or compartment, certainly make it preferable to any other mode of lighting, if it is desired to be able to read a long time without fatigue.

"The arrangement which appears to be the most advantageous is to place accumulators under or on each car, a single group for all the lamps, or a separate battery for each lamp, these accumulators being charged at fixed points, either with or without removal from the train. The weight of the accumulators necessary for 22 lamps in a car is about 1,100 pounds. (This is no more than that of the Pintsch gas apparatus, which varies from about 1,000 to 1,300 pounds per car, as stated by Mr. P. Lefavre in a report on the dead weight of trains.)

"Where for particular reasons it is necessary to dispense with this additional weight, it is still possible to light successfully trains which are not to be broken up by a dynamo placed in the baggage car and operated from an axle or by steam from the locomotive. When this latter plan can be combined with the heating of the train by steam, it seems to be a very economical method. The experiments in the electric lighting of trains are, however, so recent that, notwithstanding the importance of the results obtained, none of them are conclusive." The authors finish their report by recommending to the different railroads further experiments in this direction.

In our own country progress has been made principally in the direction of lighting by a dynamo and engine in the baggage car, supplemented by accumulators under each car which are kept charged by the dynamo running in the day time as long as may be necessary. This arrangement seems to give the most satisfactory results, though it has yet been applied only to a few luxurious trains which are never broken up, and which run for long distances. It remains to be seen whether it can be made practically successful on trains of the usual character. Thus far it has been found necessary for a competent electrician to accompany each train, the apparatus requiring too much care to be put in charge of any of the trainmen in addition to their other duties.

The Intercolonial Railway of Canada has, however, continued experiments with accumulators alone, they being charged at three different points on its line, and running about 500 miles with one charge, when they are replaced by a fresh set. The number of 16-candle-power lamps in each car varies from 11 to 22, and more than 40 cars have been fitted with electric lighting. In the number of cars lighted, this road is equalled or exceeded by but one or two in America. The results obtained, are, on the whole, favorable, but the electric light is not exclusively depended on, the oil lamps having been retained in all these cars, and, it may be said, frequently used. A fourth charging station is now being built, to save the necessity of sometimes extinguishing the electric lights on the return trip, owing to the charge in the accumulators having become exhausted.

The Boston & Albany Railroad has lately discontinued the use of electric lights on the limited express trains between Boston and New York and substituted Pintsch gas. This step was taken partly because of the great expense attending the use of electricity (the accumulators being charged by electric lighting companies at either end of the line) and partly because of a considerable number of cases where the lights failed altogether or were unsatisfactory. It was precipitated by the suspension of electric service in New York City, rendering the use of the oil lamps necessary on one trip each day in one direction in such of the cars as were supplied with them.

The drawing-room cars were fitted only with electric lamps; hence these were in darkness, and after the second day were withdrawn from service until they could be fitted with gas lamps.

Attempts were made, it will be remembered, for a few months in 1887, on the Connecticut River Railroad, to run a dynamo from one of the axles of a baggage car, but after successive trials of transmissions by belts, ropes and chains, it was abandoned as impracticable, and there have since been no experiments of this kind on this side of the Atlantic. The reason of its success abroad lies in the fact that the cars there have but a single pair of wheels at each end, and because of the few curves and high speed of trains on the principal lines. In all these installations the direct source of supply for the lamps is a battery of accumulators, located either in the baggage car or distributed through the whole train. The function of the dynamo is to keep these fully charged. An automatic switch is also necessary to cut off the connection between the dynamo and accumulators whenever the speed falls below a certain limit, else the accumulators would discharge themselves through the dynamo and possibly ruin it, besides greatly injuring themselves. Skilled attendance is also advisable, and in many cases absolutely necessary.

Electric lighting of cars in America must therefore be considered as at present a luxury, to be used on a few

trains in exceptional circumstances, and not yet developed either in appliances or in cost to a point where it can compete with oil or gas for everyday use. But as the luxuries of one generation become the necessities of the next, the beauty, comfort and healthfulness of the electric light may yet make it indispensable to all first-class railroads, and inventive genius will yet produce apparatus for generating it which is convenient, reliable and cheap.

The Swiss Railway Union at a meeting on Nov. 2 last passed the following resolution: "That, considering the actual position of electric lighting, it is not desirable to extend the lighting of trains by gas, but that it is preferable to continue the investigation of the electric-lighting problem, and to extend experiment." Experience in this country will hardly warrant so strong a statement, but further investigation is certainly needed before a final determination.

The Wear of Rails as Related to their Section.*

The present paper was suggested by the paper read by Mr. R. W. Hunt, at the New York meeting, in February last, on rail sections, in the discussion of which I brought forward some of the facts and observations here stated. Professional duties having prevented me from writing out my part of that discussion in time for its publication in the volume containing Mr. Hunt's paper, I take the opportunity to present it in separate form and greater fullness.

The striking features of the series of rail sections submitted by Mr. Hunt are their shallow heads and heavy bases. [See the *Railroad Gazette*, June 7, 1889, for Capt. Hunt's paper in full.] In these respects they are quite similar to the section of the 80-lb. rail, which I designed in 1883 to meet the requirements of the traffic of the New York Central & Hudson River Railroad. Before the adoption of the 80-lb. rail, this road had modified its 65-lb. section from a shallow head with rounding sides and quite heavy base to one having a deep head and thin base. All the leading railroads had changed from the earlier sections of steel rails to those having deep heads and thin bases, conforming to the recommendations of the Committee on Rails of the American Society of Civil Engineers. Fig. 1 shows my 80-lb. section of 1883. [This section has been repeatedly shown in these pages, and the cut is not reproduced.—EDITOR.]

Before designing this rail I had taken, at different times, a series of diagrams of the condition of tracks, with my car, on the New York Central & Hudson River Railroad, all of the New England railroads, and all but one of the trunk lines. My diagrams gave me an opportunity which could not otherwise have been obtained to see the wear of great numbers of sections of rails under widely varying conditions of traffic.

In nearly all cases it was observed that the deep headed rails wore more rapidly than the shallower headed; and furthermore, did not wear as smooth, the metal on the surface of the rail flaking out in thin, irregular patches to the depth of $\frac{1}{16}$ of an inch, or more, instead of wearing off smooth, as in the older rails.

The crystallization usually appears much coarser in the deep than in the shallow heads, and a thicker layer of metal intervenes between the crystalline groups or aggregates. Fracture usually occurs between the crystalline groups, not through such a group. In rolling a tire or rail, a group of these small crystals is elongated and flattened in a plane parallel with the surface. The crystals are first thinned, then loosened by wear, and finally they flake out, leaving a very uneven surface on the tread of the tire or the head of the rail. The depth of these depressions is, as I have said, about $\frac{1}{16}$ of an inch. They are found to range in number from 6 to 15 per square inch.

Now the early steel rails did not flake out, but wore smooth. It is evident that the chemical composition of two rails may be nearly identical, and yet the difference in the grain of crystallization may give them different physical properties.

It was the consideration of these features which led me to design the broad and shallow head of the 80-lb. rail. My first object was to lessen the pressures per unit of contact, thereby reducing the rate of wear of the rail-head and the tires.

The rails of which I had diagrams weighed 56, 58, 60, 65 and 67 lbs. per yard, and ranged in height from $3\frac{1}{2}$ to $4\frac{1}{2}$ in. In the track of the Boston & Albany Railroad there were several miles of 72-lb. rails, $4\frac{1}{2}$ in. high. The diagrams of the condition of track showed conclusively that none of the rails were stiff enough to carry the traffic for any length of time and keep their surface without constant attention.

The rails examined in the tracks with the aid of the track-deflection apparatus of my car, to test the condition of their surface, were found to have definite forms of permanent set, which could be directly traced to want of care in the track, or, in some cases, want of care in manufacture.

Rails which were low at the joints and high in the centre being the most frequent, I called the first form of permanent set; rails low at the joints and centre but high in the quarters I called the second form; rails, the surface of which was a series of short waves, I called the third form.

Combinations of the first and third, and the second and third forms were frequent. As a rule, rails laid with opposite joints show predominantly the first form of permanent set. In rails laid with alternate joints, on the other hand, the second form predominates, provided the section of the rail, joint-fastening and labor expended in maintenance are sufficient to maintain the track under the traffic. If either of the three requisites be lacking, rails of the second form sooner or later pass to the first form of permanent set. This occurs very soon in plank or paved stations and at road crossings. If the joints deflect $\frac{1}{8}$ of an inch or more under passing trains, the receiving ends of the rails will be cut out.

The deflection of rails under the wheels of trains are more extensive than is generally supposed. The subject has not received the attention due to its importance, in view of our present wheel tonnage. In low and light sections the weight of each wheel is not distributed over five or six ties, but is concentrated, for the instant, upon two or three—two, if the wheel is between them; three, if the wheel is over a tie. The second or third tie, as the case may be, is relieved of pressure, the base of the rail being under compression instead of tension, as would be the case with a rail of proper stiffness. The concentration of the wheel-weight over a small area of ballast quickly disturbs it; the spikes are started, the ties be-

come loose, and are rapidly abraded under the rails, while the labor to maintain the track is much greater than would be the case with stiffer rails. This has been well demonstrated by experience with the 80-lb. rail. In its design the stiffness of the section was an important feature, for the reasons above stated. Up to the present date it is stiffer than any 85-lb. section yet produced. The following table gives its deflections under loads:

Tests of the 80-lb. Rail of the New York Central & Hudson River Railroad for Deflections Upon Supports 36 in. Apart, by the U. S. Testing Machine, at the Watertown Arsenal, June 21 and 22, 1888.

Load applied in pounds.	Deflections in inches.	Load applied in pounds.	Deflections in inches.
2,000	0.	26,000	0.0238
4,000	0.0022	28,000	0.0277
6,000	0.0048	30,000	0.0300 set 0.0028
8,000	0.0071	40,000	0.0400 " 0.0036
10,000	0.0091 set 0.0019	50,000	0.0498 " 0.0048
12,000	0.0112	60,000	0.0597 " 0.0063
14,000	0.0133	70,000	0.0722 " 0.0085
16,000	0.0154	80,000	0.0855 " 0.0116
18,000	0.0175	90,000	0.1326 " 0.0447
20,000	0.0196	100,000	0.2488 " 0.1477
22,000	0.0218	110,000	0.4125
24,000	0.0239	120,000	0.6440 " 0.5143

The tests from 80,000 to 120,000 were made June 22, the rails resting 15 hours in the meantime. The rail only contained 0.32 of carbon, too soft for the best wear.

Two difficulties will be experienced in substituting the heavier, stiffer and broader-headed rails for the lighter sections in general use:

1. The want of experience on the part of the mills to finish the heavy and stiff rails as perfectly as the lighter sections they are accustomed to rolling.

2. The wearing or shearing of the edges of the broader rails by wheels having hollow treads, worn by narrower-headed rails.

Both of these difficulties will disappear to a great extent upon a more general use of the broader-headed rails. As to the first, the finish of rails of the same section is not uniform among mills. As a rule, too much camber is given to the rails when hot; and in taking out one long bend by the gag, two or more short ones are put in. In heavy rails these short waves are more noticeable than on light sections, and give an unpleasant tremor to the cars. The trackmen cannot remedy them.

The difference in the finish of the rails is so distinct as to enable me often, where the rails are new, to tell from my diagrams the name of the maker. To the credit of the mills, I should say that there has been a decided improvement in the finish of rails during the past few years.

As before observed, too much camber is given to the heavy rails when hot. Some of it is left in them when they cool. It should be the other way. The head of the rail might well have a true concave curve of an inch versed-sine, which would readily "surface" and tend to check for a long time a permanent set in an opposite direction.

But little experience has yet been accumulated as to the effect of the 80-lb. rails on the service of tires. The records of the tires of locomotives Nos. 80 and 503 of the New York Central & Hudson River road are as follows:

No. 80 has run 42,908 miles, making 5,700 regular starts and stops. Figs. 17 and 18 are sections showing the wear of these tires.

No. 503 has run 54,300 miles, making 16,280 regular starts and stops.

The proportional wear of the tires is less than the average for the class of service performed by narrower headed rails. The radius of the curve-worn tread of the tires so far is 13 in., 1 in. more than that of the head of the rail.

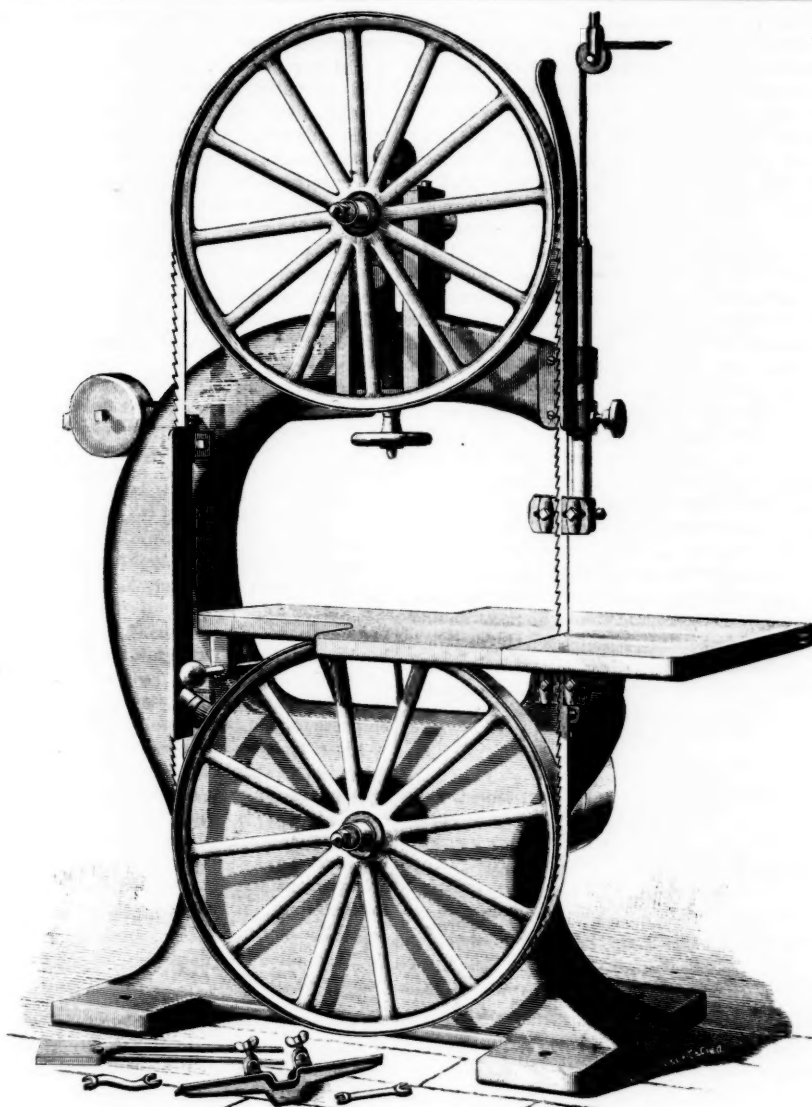
The abrasion of ties under the 80-lb. rails ($4\frac{1}{2}$ -in. base) is very much less than the rate under the 65-lb. rails ($4\frac{1}{2}$ -in. base), the decrease being principally due to the increased stiffness of the rails. The latter feature has also checked to an unexpected degree the rate of oxidation of the 80-lb. rails in the tunnels, as compared with that of the 65-lb. rails. The rails are so stiff that after four years' service, the deflections of the rail have not detached the first scale of oxidation, which has served, in a measure, as a protection against further oxidation. Where the rails rest on the ties, abrasion has kept them bright, and here some loss of metal occurs—about $\frac{1}{16}$ of an inch in four years, which is only about one-quarter the rate on the 65-lb. rails, although the annual tonnage passing over the rails has largely increased.

The fillet of $\frac{1}{8}$ -in. radius on the under side of the head of the 80-lb. rail was deemed necessary to prevent the head from canting over in worn sections. A large number of worn sections, having a fillet of $\frac{3}{16}$ -in. radius, were found canted over on tangents, while on curves it was very common to find the heads canted out of their normal position. A $\frac{1}{8}$ -in. fillet gives less support than the $\frac{3}{16}$ -in.

Improved Band Saw.

The Egan Co., of Cincinnati, have recently put upon the market a line of band saws of various sizes, adapted for light and heavy work. The machine here illustrated, the No. 3, is designed for use in car shops, agricultural works, wagon shops, etc., being suitable for heavy sawing, and also well adapted for driving light saws. The frame is stiff and of graceful design. The band wheels, after being turned perfectly true, are covered on the faces with rubber bands, an arrangement favorable for running saws of various sizes, and greatly lessening the chances of breakage. The bearing of the upper band wheel is fitted to guides, and can be raised or lowered by a screw and hand wheel. This screw is connected with a weighted lever, for the purpose of applying tension to the band saw, and by adjusting the position of this weight the tension can be varied as desired. The bearing of the upper band wheel is arranged to swivel, and can be readily clamped tight in any position. The saw table is of cast iron, planed smooth on top; and this table can be tilted and locked at any angle, the centre of oscillation being the point at which the saw passes through the top of the table, so that the saw always works true at every angle to which the table is tilted. Roller guides for the saw are fitted both above and below the saw table, the upper guides being arranged to slide up and down, with a clamp and counterweight for the guide bar. The belt shifter for the fast and loose pulleys of the driving mechanism is connected with a brake which brings the

* Extracts from a paper by P. H. Dudley, read at the Ottawa meeting (October, 1889) of the American Institute of Mining Engineers.



IMPROVED BAND SAW.

Made by THE EGAN CO., Cincinnati, Ohio.

saw to rest in a gradual manner, but quite promptly, as the belt is shifted from the fast to the loose pulley. The band wheels of this machine are 38 in. in diameter.

Economical Work in a Car-Record Office.

The car-record office of a well-known road having introduced the piece-work system in one of its departments, we have got from the officer in charge an account of the change he has made, and his experience with the new plan. All interested in this department will find it well worth reading. After giving due credit to his assistant the writer proceeds as follows:

The essential requisites of a car record are: First, that it should give an accurate location of cars belonging to the home road, whether at home or on foreign lines; second, that it should give so much of the movement of all cars, whether home or foreign, on the home line as will enable the car recorder to answer with reasonable promptitude all questions liable to arise.

Forasmuch as most of the movements on the home line are never referred to, there are possible improvements in the line of diminishing the number of these entries; but at present, owing, among other things, to errors made by agents or conductors in reporting cars under the wrong numbers or initials, or failing to report movements actually made, it is the practice in my office, and I believe in most large offices, to enter every movement of every car on the line. Experience has shown that the best and most accurate record of these movements can be obtained by posting them from the conductors' reports; that is to say, each conductor, freight or passenger, makes a report of all the cars handled by him, where taken and where left, and forwards it at the end of his trip to the Car-Record Office, either directly or through the Train Dispatcher. Reports of cars going off or coming on the line are obtained from an interchange report made by the station agents at junction points. Movements of home cars between foreign roads are obtained from junction reports, which are very generally exchanged between the railroads in the United States and Canada. From shops, situated on the home line, we obtain reports of cars put in for repairs, and of cars built or destroyed. These are the principal reports coming into the car-record offices. Ours aggregate 17,000 movements daily.

Now, as this number is entirely too great to be entered by one man, the work has to be divided; and the most obvious way, the way generally employed, is to give each

clerk the movements of a certain number of cars to keep (one to 3,000 of our own road, for example), and let him enter all the movements of these particular cars, whether at home or abroad; another clerk taking another range of numbers, 3,001 to 6,000 we will say, another taking the foreign cars of a certain range, and so on to the end of the chapter. In other words, just as a bank clerk will keep a ledger of a certain run of names, and is responsible for his book only, the car record clerk is responsible for the cars contained in his book, and for none other.

Now, while this system works well on small roads where two or three or at the most half a dozen recorders are employed, there soon gets to be a good deal of lost motion about it. Take the case of my own office, where there were, when I made the change, about 12 recorders. It follows that each one enters on an average $\frac{1}{12}$ of the cars that appear on the reports; that is, he looks at 11 car numbers he does not want for every one that he enters; and in an office receiving 300 reports daily he will probably be doing a good day's work if he enters three cars on each report, or 900 movements. Nor is this waste the only evil; bent entirely on looking for his own cars, he pays no attention to any of the rest, so that as the reports pass from hand to hand if any are skipped they are not again caught up; so that, as I am informed, the missed records in this way seldom fall below three per cent., and may rise as high as 10 per cent. of the total movements. In fact, in my office it would take the entire time of a good clerk to go over the reports a second time and see that these missed movements were entered.

It was for the sake of correcting these defects, more than with the idea of putting men on piece work, that the system in vogue in my office was inaugurated, now over four years ago, though the change made it possible to pay the men by the number of entries they put in.

The change was simple but radical. Instead of letting each man handle all the reports and enter into one book, we gave him only a certain number of reports and let him enter all the cars on them in all the books necessary. Hence it followed: First: There were no missed entries, since every car on the whole report had to be checked up. Second: The lost motion, so to speak, was reduced to a minimum, for although there were just as many unentered cars as before for the first book, yet on account of the increasing number of cars that were checked off, and the increasing familiarity of the clerk with what was left on the set of reports as he proceeded, the work of searching for particular cars grew less

and less. Third: And this is the point which principally interests us here, by simply adding up the total number of cars on the reports handled by each clerk we knew just how many entries he had made, and, of course, could and did from the start pay him on this basis.

At first the pay for all entries was the same, being based on the average pay of the clerks, and the requirement was 1,000 entries per day for \$50 per month; but experience having developed the fact that under the new system some of the younger and newer clerks earned much more than the older ones on miscellaneous work, so that promotion based on the record became impossible, and that some classes of the work was worth more per entry than others, together with the further fact that the books had been improved so that more entries could be made with the same amount of work, we finally fixed upon the following scale of prices:

Entries from conductors' bills (reports) made in pencil	\$1.15 per 1,000
Delivered, Interchange, in red ink	1.20 " "
Shop reports, in red ink	1.20 " "
Junction reports in red ink, on account of being a double entry	1.30 " "

This scale works satisfactorily. Under it some clerks have made as high as \$86 per month, but in order to earn this amount it requires such long hours and so much hard, continuous work that all are glad to accept positions in the office on miscellaneous work.

In order that this schedule should be adopted on another road similar in all respects to ours, I believe the books should bear a close resemblance to those we use, which are the development of a number of years. The page is of a double cap size, and each book contains from 120 to 200 pages and lasts one month. The work is given out by the clerk who opens the mail and arranges the reports, each clerk getting more or less, according to the amount to be done and his own capacity to put in a certain number of entries well. The work is returned to the Supervisor of the Record, who examines the reports and credits each clerk with the number of entries made.

I need not expatiate upon the advantages and disadvantages of piece work generally. Inherent in it all is a tendency to get a great quantity of work of low quality. Therefore, we soon found it was necessary to employ a clerk to supervise the record to see that the work was well done.

By the schedule of prices adopted we are able to employ this clerk at a salary of \$30 a month without increasing the cost of the record over the old plan, and the quality of the work is far superior to what it used to be.

Since many mistakes may be made without being detected, heavy fines, in entries, are imposed for every mistake found. For example, entering a car under the wrong number entails a loss of 50 entries. Of course the work in the office is elastic, closely following the changes in the volume of business. The complaints of the clerks may be of too little work, never of too much. The greatest advantage is the increased mobility of the forces. Where, under the old system, one man kept one book, he became adapted to it, and could not be changed readily to another, and in some cases there is a special knowledge required how to enter certain kinds of cars. Therefore, under the old system, when a clerk was temporarily absent, his work was neglected or done in an inferior manner. This is especially inconvenient in a car-record office, where prompt recording is necessary. This trouble is now entirely avoided. Every clerk must be capable of entering in any book, therefore the absence of one, two or three merely increases the allotment of the others, without inconveniencing or delaying the work of the office.

In order that the work should go regularly through the books, I deemed it necessary to have a schedule assigning the limits of time during which each clerk should be entitled to any book, but as this had some disadvantages, it was allowed to lapse.

So well do I think of this plan to-day, and so satisfactory are its workings, that I am maturing a plan for putting the calculation of the mileage, which requires the work of 10 clerks, on a similar piece-work principle.

Telegraph Wires in Europe.

In England, France and Germany the telegraph wires along the railroads are much nearer the ground than in the United States. In many cases persons standing on the ground can reach the wires. The exclusion of the public from the right of way undoubtedly permits such location of wires without inconvenience to the operators. The wires themselves in many cases are mounted upon iron poles without cross arms, but with a series of iron hooks upon which the insulator is suspended.

Legislation for Greater Safety.

The following resolution was unanimously passed by the Farmers' National Congress, assembled at Montgomery, Ala., Nov. 15, 1889:

The greatly increasing number of accidents to trainmen on our railroads, from coupling and uncoupling cars, and from using the old hand brakes on freight cars, demands a thorough investigation by proper governmental authority, to the end to ascertain if there is not some more safe and practical method by which these faithful public servants can do their work without the terrible sacrifice of life and limb, as casualties to the number of over 6,000 yearly from these sources now occur, and, also, what legislation is needed to require the adoption of the best known practicable safety appliances by railroad companies. The secretary is requested to forward a copy of this resolution to the Interstate Commerce Commission.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Mr. P. H. Dudley's short paper on rail sections and rail wear, which appears in another column, should be read by those interested in rail design. The theories which he carried out in the New York Central rail of 1883 have now become common property, and, in fact, have become quite the fashion. They are but briefly stated in the paper before us, but the statement is detailed enough to refresh the memory of those who have not followed the more recent discussions carefully. It will be noticed that Mr. Dudley recognized the better internal structure of the metal in the thinner heads, but that his first object in designing the broad and shallow head was "to lessen the pressure per unit of contact." He calls attention to the importance of stiffer sections to prevent permanent deflections and consequent roughness and wear of the surface, to preserve the ties and to check oxidation in tunnels. This last condition is not a very important one on most lines, but is interesting, and the result appears to have been quite unexpected. Mr. Dudley makes one suggestion in which we cannot agree with him. That is, that the rail should be left an inch low in the middle. To be sure, he has found the most common form of permanent set to be high in the middle and low at the joints. But if the rail is straight when put in the track, is of a stiff section, is laid on good ballast, has a proper joint, and the joint ties are kept well tamped, it will, we judge, be long in getting this set. Lacking one or more of these conditions, it will tend to take a set one way or the other, according to which conditions are wanting.

Vice-President E. B. Thomas, of the New York, Lake Erie & Western, recently arranged a plan for the examination of trainmen on the rules, requiring answers in writing, the general idea being the same as that heretofore carried out on the Fall Brook Coal Co.'s lines, and to a limited extent elsewhere, though the arrangement is more elaborate, and the forms more carefully got up. Of the propriety, and even the necessity, of such a proceeding as this there can be no question. There may be roads whose men are so well known to the superintendent that he needs no formal record of their character and abilities, but on the average road there are certainly enough men who must be regarded as exceptions to this general statement to not only justify but to demand such an inquiry. But on the presentation of these documents to the Erie engineers, firemen and brakemen, strong objection was at once made. The ostensible ground for this "kicking," as given in the newspapers, is the requirement of a written acknowledgment of Rule 8 of the Standard Code, which says that the company will not recognize any claim of an employé for allowance on account of disablement from any cause. The reports say that Mr. Thomas at once waived the point, omitting this question from the list. This rule will some time be

regarded as a relic of partially uncivilized times, —if it is not, indeed, so regarded already by the most advanced railroad managers. It includes, to be sure, an unwritten proviso that the company will not recognize any claim which the law does not compel it to recognize, as is the case with legal papers generally; but it is not to be expected that the average railroad employé—certainly not if he belongs to one of the brotherhoods of the present day—will fully appreciate this delicate point. He cannot readily be made to believe that he is not signing away some of his rights. It is, perhaps, needless to say that this is not the only rule of this nature on which managers might do well to disagree with the majority of the Time Convention to the extent of omitting it when making use of the Standard Code. The Convention quite likely meant this paragraph to apply merely to questions of wages and not to damages for negligence. We have not yet heard what effect Mr. Thomas's concession has had upon the men. It certainly has not harmed the company in the least. We hope that this objection has not been made simply a cover for objections to questions concerning other rules in the code. Objections to a catechism of this sort have been made on the most indefensible grounds, as our readers know; as, for instance, by color-blind men who insist on their right to run a locomotive, and by persons unable to read and write who insist on holding positions which they cannot possibly fill without that ability, except as they have an interpreter at their elbow. We hope there are no such misguided men on the Erie.

The most satisfactory location for the radius bar pin on locomotives having radial trucks is being discussed again and with some rather surprising developments in some quarters. In instances that have come to our knowledge, an examination of several types of consolidation engines showed locations of the pin, which did not accord either with the location given by that formula which has for its basis the maintenance of the truck axle in a position coincident with the radius of the track, or with any constant modification of that formula. Many of these differences arise probably from changes made in the driving wheel base without corresponding changes in the length of the radius bar or the truck. There is for each particular flanged wheel base a location of the radius bar pin such that the truck axle will always be held in a line coinciding with the radius of any curve on which the locomotive may be standing. If the pin is moved backward toward the drivers, *i. e.*, the radius bar lengthened, the inner wheel on the curve will lead the outer one. If the radius bar be shortened, the outer wheel will lead the inner one. If the front drivers be flanged, the location of the pin to bring the axle always to a radial position will be materially different from that position when the front drivers are plain. It often happens that the pin cannot be located where the conditions of the design demand, therefore it has either to be carried forward or backward to obtain a point of attachment. It can be seen from this that changes in the wheel base or in the location of the plain tires call for changes also in the location of the radius bar pin if the truck axle is to be maintained in a radial position, and it is probably on account of this that so many departures from a standard location are found among engines having radial trucks. While the location of the radius bar pin according to a formula such as that referred to will cause the axle to be maintained in an exact radial position on any curve, yet that position is not considered by all to be the most satisfactory one. Some designers prefer to shorten the radius bar and thus cause the outer wheel to lead on a curve. This, if carried to a sufficient degree, will make the flange of the inner wheel crowd against the inner rail instead of the outer wheel flange against the outer rail by reason of the curvatures of the track, as the case would be with the pin in the position given by the formula before mentioned. Two points of advantage are by some supposed to be gained by the shortening of the radius bar:

(a) A decrease of the flange wear on the truck wheels.

(b) A decrease of the flange wear on the front flanged drivers.

If the radius bar is shortened only that amount which will relieve the pressure of the flange of the outer wheel on the outer rail, then the first advantage is gained. Just how much shortening will be required to do this is not generally known, and only from experience can it be determined. If the pin be moved too far ahead then the inner wheel will grind on the inner rail and the resistance of the locomotive on curves will be increased. Regarding the decrease of wear on the flanges of the drivers, there is little to be gained by shortening the radius bar.

It is true, of course, that the leading of the truck against the inner rail will cause a slight lateral pull at the radius bar pin, tending to drag the locomotive into the centre of the track; but the lateral pressure caused by the angularity of the swing links in the truck is so much greater and acts with such an increased leverage, that the effect of the leading of the outer truck wheel is small in comparison. This whole question needs thorough investigation in actual practice with full-sized locomotives. While many of the possible positions of radius bar pins are not either desirable or advantageous, yet a slight shortening of the radius bar from that length which maintains the axle in an exact radial position on all curves will give results which will be quite satisfactory.

Equities of Freight Car Service.

We print to-day another communication from Mr. Wattson on the car service problem. The substance of his argument is that it is useless to build more cars, because we already have all that our terminals can accommodate, and that the aim of the railroads should be to spread the autumn rush of freight over a larger portion of the year. If a road hauls 1,000 freight cars a day during four months of the year and requires 50 engines to do it, and during the other eight months hauls only 500 a day and thus has 25 engines idle, it should endeavor to reduce the maximum to, say, 700 a day by taking means to induce shippers to hold back some of their offerings. This would reduce the number of engines necessary to 35, make the average daily traffic in the lighter months 650 cars, and leave seven per cent. of the engines at liberty to go to the shops for repairs. Even an approximation to this would be worth some trouble. As pointed out heretofore, a principal means of equalizing traffic is the construction of storehouses. These are needed in all sections, but more especially at Western shipping points for grain, and at numerous small consuming points for coal. To compel the erection of storehouses, it must be made more costly to use cars for storing purposes.

The seriousness of the problem is brought out in Mr. Wattson's last paragraph. If the railroads were in reality what the public supposes them to be, a compact system, something might be done. It is true that the traffic men can stop the billing of freight to order—or greatly abate it—if they will charge for detention, and we said as much in the article Mr. Wattson quotes from. It is also true that they can avoid ruinous rate cutting—if they choose to. But when a freight agent is not getting what he calls an equitable share of the traffic his temptation to cut rates is so strong that it is practically true that he cannot resist it. Relaxation of demurrage rules will afford even a better chance for competing "on the quiet." We have seen, since the Interstate Commerce law has restricted direct rate cutting, how easy it is to resort to manipulation of storage charges, icing charges and mileage on private cars, and to under-billing and other devices for getting business.

In view of the well-settled practice of giving the use of cars for storehouses, the assessment of a charge for the service is looked upon now by the consignee as a direct increase in the rate, and the question therefore becomes subject to all the forces that cause fluctuations in rates or affect them in any way. Heavy traffic over important routes, as, for instance, grain to the seaboard or coal to the seaboard or to the lakes, has to be carried at prices very little above cost, if not below it. Detention charges will come under the same influences and consequently a variable rate seems inevitable. It is true that carloads of grain and coal will not stand a charge of \$1 a day, but that makes it all the more necessary to reduce the charge below that figure. If roads which now give away valuable track room, cars and switching service for nothing could be induced to collect even 25 cents per car per day for it a manifest improvement would be accomplished, but no one seems to have gone about it in this way. A dollar or nothing is the prevalent notion. The provision for additional days' free detention for coal cars at Cleveland, and one or two other points, which is virtually a reduction in the rate, is the only positive movement yet made in this matter. Inequalities in demurrage charges which are apparently unjust will be necessary everywhere and they should be boldly made. This of course should not be done without sound economic reasons, and these must be ready in case of an attack before the Commission or the courts.

No road will be willing to limit its cars and engines to the capacity of its consignees to receive freight, at least not in the case of vehicles which can be used in all kinds of service, as common box cars. To be prepared

for sudden large demands of customers is one of the first principles of business, and this is often, and perhaps generally, prudent even at the expense of some slight direct loss. Fluctuations of markets and of ocean rates and other causes will produce occasional gluts of traffic in spite of anything the railroads can do, and the road that is best prepared to meet such an emergency will "scoop" the traffic. Extra wagons and houses, temporary storage grounds and other expedients of consignees can be so readily made available that consumers can always keep ahead of the railroads. It is useless to try to stop this tendency; the aim must be to control it, to keep it within fairly reasonable bounds. If the Pennsylvania builds 3,000 grain cars and scatters them throughout the West to catch shipments when cars are scarce, the New York Central, the Erie and the Baltimore & Ohio will be strongly inclined to follow suit. The most the transportation departments can hope to do is to impose a small per diem charge which, while not attempting to do exact justice on all hands, shall tend to at least partially equalize the differences between the poor roads and the rich ones.

There is no real opposition between the permanent interests of the traffic department and the transportation department. But a shortsighted effort to pursue the apparent interests of the former, without regard to economy, does great harm all round. The tendency toward such shortsighted policy in seasons of active railroad competition is very great. There are times when each road individually is compelled to do what all roads acting in common would find it advantageous not to do. Economy can only be secured by taking joint action, which involves some system of arbitration between rival interests. This is just what is done, in effect, when an impartial demurrage commissioner is appointed at a competitive point. If the superfluity of cars in dull seasons does not make the expense of these commissionerships burdensome there will be ground for strong hopes of improvement at this point. If an equally simple device for securing impartiality could be applied to the lending of cars by rich roads to poor ones we could indulge in definite hopes of happiness. But Western grain-gathering roads will not erect buildings to store grain so long as they can borrow cars for nothing to be used for that purpose; and Eastern roads will not stop giving away this storehouse service so long as they can make these cars earn, in mileage, 30 per cent. per annum on their cost while running, even if they do stand two or three weeks waiting for loads. It is true that overproduction of cars is expensive, but this expense is spread around through so many departments that the directors conceal it, even from themselves. If it ever is visible it is only for a limited time, and if it is offset a few months later by a period of activity in which every car earns \$10 a day for a while, past tribulations are forgotten. Many of the expensive operations of railroads are more or less blind ventures depending upon the future, and building surplus cars partakes of the same nature. We hope, however, that Mr. Wattson and all friends of economical working will continue to agitate the subject until its *rationale* shall become generally familiar.

Signaling on the Pennsylvania Lines.

We print in another column a reply to the communication published Nov. 8, concerning signaling on the Pennsylvania lines west of Pittsburgh. Some portion of this reply reiterates what we said in the editorial column in commenting on the first communication. The reader will recollect that on the question of the position of arms and the use of indicators we agreed with the views of the Pennsylvania officials and replied to P. S. E. on that basis.

The best means of signaling several diverging routes is a rather troublesome question, but apparently the best arrangement possible in the present state of the art is to use the top arm for the high-speed route, and an arm below, with indicators, for the other routes. The use of several arms on one post, arranged according to the position of the tracks, the signals from top to bottom to apply to the tracks from right to left, in order, is quite common. It is easy enough to make the main line signal conspicuous and distinctive by day by its size. By the use of illuminated blades the same thing can be accomplished by night. In fact, it is not uncommon now to govern secondary tracks leading off to the right by smaller blades placed above the main line blade and illuminated at night by reflected light, while the position of the main blade is shown by the ordinary colored lights. There may be a question as to the efficiency of illuminated blades, when the illumination consists of nothing but a common lamp whose rays are thrown obliquely upon a plain white board, but with the illuminated blades

now obtainable this need not be an objection. In fact, the Pennsylvania Company expressly directs the use of illuminated blades in all new work and repairs, so that it can have no doubt of their efficiency. The use of more than two blades on one post, and placing them in the order of the tracks, seems therefore to be feasible enough so far as the objections made by "Committeeman" go, but the use of one blade for the main line, and another below it, with indicators, for branches, has the advantage of compactness, simplicity and ease of reading. The route is indicated so precisely that the runner need have no hesitation as to which route is open. The use of a single blade to indicate that one of two or more secondary routes are clear, but without an indicator of any kind to tell the runner which of the tracks he is to enter, should hardly be regarded as good practice. It is in the nature of a makeshift or compromise, and is but a degree better than the old plan of omitting the signal entirely and signaling by flag or hand lamp.

In speaking of distant signals we did not particularize, but there certainly may be a conflict under Committeeman's rules. If two towers were located 2,000 ft. apart, as at A and B,

A a^1 b^2 b^1 B
the home signal b^1 , 475 ft. from B and the home signal a^1 , 475 ft. from A, would be 1,050 ft. apart, and the distant signal b^2 for the protection of b^1 could not be placed far enough away without interfering with the Pennsylvania regulations. If it were 1,000 ft. from its home signal it would be only 50 ft. from a^1 . We do not understand that towers located in yards have no need of distant signals. There are many yards where there are a considerable number of diverging tracks and crossovers for switching purposes, and yet where the tracks must be signaled so as to permit passenger trains to run through at a speed of, say, 25 miles an hour. To do this distant signals would be required.

The first part of Committeeman's letter is simply a discussion on the meaning of the words "home" and "auxiliary" as applied to signals. He uses "home" in the sense of "positive," while P. S. E. restricts it to one class of positive signals, using the word "starting" for another class of positive signals. We are inclined to agree with the latter view, for the reason, first, that it coincides with long-established custom, and, second, that we see no good reason for changing the prevailing practice in this respect. But as regards the word auxiliary, we must agree with P. S. E. It is fallacious to suppose that signal B in any way assists signal F. Each is a positive signal in its place, and each works without any reference to the other. We may add that we hope the Pennsylvania Company will put in a large number of starting signals, whatever name it may see fit to call them by. Their use has been highly developed in England. There, in fact, stations where there are sidings are often, if not generally, provided with four signals, the distant, the home, the starting and the advanced starting. By the use of the latter the signalman can control and protect two trains at the same time on the same track.

The Commissioners on the Palatine Bridge Accident.

The New York Railroad Commissioners' recommendations to the New York Central, made as a result of their investigation of the Palatine Bridge collision, viz., to make the interval between passenger trains 10 minutes; to consider the question of block signals, and to equip six-wheeled trucks with brakes on all the wheels, are eminently sensible so far as they go. These recommendations were printed in these columns last week, but the full text of the report calls for such varied comment that we withheld it for further consideration.

A 10-minute interval is undoubtedly the smallest that should be regarded as practicable under the average discipline of the day. Seven minutes, which has lately been adopted by the Baltimore & Ohio, implies the necessity of an alert and careful class of trainmen. Even a five-minute interval is safe if the speed of freight trains is rigidly limited, the braking power of passenger trains maintained at a high standard and every brakeman is known to be first class; but the whole question is, in a sense, a comparative one, as even a twenty-minute interval would be unsafe with some classes of men. The Commissioners allude to the fact that the New York Central has the authority of the Time Convention for its rule. It should be remarked, however, that the prevalence of this view in the Time Convention was doubtless a result of arguments presented by managers who strictly enforce the five-minute interval and who take equally stringent measures to have caution signals during the sixth and tenth minutes, inclusive. Indeed, the New York Cen-

tral had this rule on its time table, and we understand that one of the first moves made in consequence of the collision was to send a special train over the road for the exclusive purpose of reining up the men on this rule. Lack of discipline in this respect, or unduly long spaces between signal stations, may undoubtedly be set down as one of the causes of the disaster.

The use of more efficient braking appliances, and especially the increase of brake power in the particular direction referred to in this case, is certainly important, and the reasons for improvement are so clearly apparent that the action of the Commissioners in allotting only two lines to this subject is not without reason. The railroad officer who does not realize the danger of running fast trains with but two-thirds of the available brake power probably will not be convinced by any extended arguments of the New York Railroad Commission.

The remaining questions are discipline of trainmen and the block system. The scene of this collision was examined by Commissioner Rickard, who is well known as a former locomotive engineer, and the report deals at considerable length with the conduct of engineers Weeks of the first section and Horth of the second, and brakeman Patten of the first. The report is not by any means an exhaustive one.

The Board "is hardly prepared to agree" with the criticism of Weeks' mistake in judgment in not stopping immediately on discovery of the injured steam chest. Commendatory allusion is made to his effort to reach a tangent before stopping, but no mention is made of the fact that he traversed a number of long tangents at reduced speed before he finally stopped. The report enlarges on the fact that escaping steam from a steam chest is an obscure and unusual difficulty, and says that such a circumstance by no means justifies the stopping of a train in every case; but the one hard fact that a very fast train was close behind, and that Weeks' knowledge of this should have made him alive to the imperative necessity of letting off his brakeman as soon as the least delay occurred, is passed over in silence, as is the question of the conductor's responsibility at this point. Reference to Mr. Weeks' age and good reputation must be regarded as a very mild commentary on his action. The Board winds up this paragraph with the words, "While it turned out that it would have been better for him to have stopped immediately upon this occasion, his mistake in judgment, if mistake it was, was of the kind that hardly justifies censure."

Brakeman Patten says he went back to a point which has been found to be 1,180 ft. from the point of collision, but Engineer Horth says that he estimated the distance at only 600 ft. The porter of President Ledyard's car says that Patten did not go back immediately, but first went forward. The Board says there is no evidence that Horth did not promptly apply the brakes, but does not attempt to unravel the discrepancies between his testimony and Patten's. The Board also fails to clear up the conflicting evidence about the showing of the train indicator at Yosts, but concludes that Horth was probably five minutes behind the preceding train.

The Board "has been investigating the matter of block systems, but has not yet sufficient data to express a positive opinion on the subject." It is difficult to understand this paragraph. The only practical arguments against the block system, certainly the only ones on a road like the Mohawk Division of the Central, where trains of different speeds have different tracks, are delay to trains and expense. With a ten-minute interval, which the Board recommends, passenger trains are 6 and 8 miles apart at 35 and 50 miles an hour, respectively. The Central could, therefore, establish blocks at four or five mile intervals, and thus increase the safety of its trains without hindering them in the least, and, in fact, could reduce the interval for the faster trains. Certainly every one agrees that a space interval is better than a time interval; and we think the substantially unanimous opinion of the most intelligent railroad officers is that this is true when the interval is maintained by a good block system, like the Pennsylvania's or the West Shore's, even in the absence of electric interlocking. So much for the question of delays. As to expense, let the Central look at the West Shore. For the first twenty stations west from Albany the Central would have to establish only two new stations to make blocks averaging less than four miles in length, the maximum being about 6½ miles. This is a crude calculation, which the officers of the road could doubtless improve upon. It does not appear that a station employee need spend any more time blocking trains than is now given to the indicators, and station operators attend to block signals in very many cases. The position

of the Commissioners is therefore inexplicable. With the experience of the past ten years in this country and of the past 25 in Great Britain, are they still without the basis for an intelligent opinion? Perhaps the financial question troubles them; but why should that modify a technical standard?

The report says President Ingalls' car, the "Kankakee," was eight or ten inches narrower than the Wagner sleeping car ahead of it, and that but for this fact the telescoping would probably not have occurred and "little or no injury would have been done."

The Regulation of Monopolies.

There was a time when people relied on free competition to regulate prices, on railroads as well as everything else. About twenty years ago, the more intelligent men began to see that this rule did not generally apply to railroads. To-day they are finding a great many other industries to which it does not apply. What was at first reluctantly admitted as an exception is now recognized to be a frequent event, if not indeed an inevitable one. Railroad pools were but the forerunners of similar combinations in almost every line of business.

There has been much theorizing on this subject, but very few statements of detailed fact. Mr. Charles Whiting Baker has undertaken to supply this deficiency in a little book entitled, "Monopolies and the People," which G. P. Putnam's Sons have just published in their "Questions of the Day" series. The author writes with great breadth of view and unusual fairness: while railroad men will find his book specially interesting for the side light which it throws on some of the most perplexing problems of political economy connected with their business.

Yet we cannot wholly agree with the author in his explanation of the case: and still less can we agree with his proposed remedy. Under the heading, "The Laws of Competition," he gives a most interesting analysis of the causes which tend to produce monopoly. But he commits the error of mixing up those reasons which justify a monopoly on the ground of public policy with those which simply make it easier for business men to keep up a monopoly whether for the public interest or against it. There are a number of reasons why monopolies do exist: there are a few reasons why they ought to exist. It is important for the sake of clearness to keep the latter separate from the former. If the two classes are enumerated indiscriminately, the few real justifications will be lost sight of amid the many causes of another character.

Why does competition fail to regulate railroad rates? Because, if it exists at all, it carries them down unduly low. It reduces them to the level of operating expenses. If operating expenses formed the main element in cost of railroad transportation, and fixed charges were comparatively small (as is the case in wagon transportation) competition might be trusted to secure a fair and stable result. But this is not the case. Fixed charges are so great that the competitive rate cannot be everywhere permanently maintained without financial ruin. The fixed charges must be paid by some shippers or at some time. In the former case we have discrimination, in the latter we have fluctuation, in rates. Both of these things are bad. The greater the proportion of fixed charges the greater will be the difference between the competitive and the non-competitive rate, and the greater the need for some more equal means of control. At the same time the waste from trying to have competition work everywhere becomes worse under just these circumstances. If fixed charges are high, the loss to the community from duplicating its plant becomes relatively greater, and the evils of such a policy worse.

The proportion of fixed charges to operating expenses is the important factor in the case. It is not that it makes competition more intense, but because it makes it act on a false basis. The question whether the establishments involved be few or many, and the question whether they do, or do not, have a monopoly of natural agents, may be of importance to the framers of a trust or syndicate; but only to the very slightest degree do they affect its public justification.

It so happens that those very causes which seem to justify a monopoly generally lessen the likelihood of evil from its operation. A concern with high fixed charges must make rates to develop a large business. Only by putting a large amount of work on the market can it utilize its plant in such a way as to produce true economy. It is the railroads with high capitalization, not those with low capitalization, which make, as a rule, the lowest rates. By the necessities of the case, the managers are forced to give the public the benefit of the reduction in operating cost. There is comparatively little reason to fear that the general scale of

charges will be high on the part of such a monopoly. The danger is from inequalities in rates rather than from absolute extortion. This makes the problem of regulation simpler than it otherwise would be.

Some of the proposed remedies would tend to increase the danger of extortion rather than diminish it. The suggestion of having the ownership of a roadbed in one set of hands and its operation in another would work in this direction. If Mr. James F. Hudson's proposals were carried out to their full extent, the causes which have produced the really marked reductions in railroad rates would have been removed. The profit in making rates to develop business lies chiefly in the fact that the greater volume handled by a carrier increases his profits as a road owner. Let the rates be made by a company which has no interest in the road, and the motive for reduction will cease.

Mr. Baker's plans are not absurdly wild, like those of Mr. Hudson; but as far as they go, they would tend to have somewhat the same effect. He would have the government acquire the title to the franchise, permanent way and real estate of all the railroads of the country, the money for this purpose being raised by issues of bonds; and he would then lease these roads in perpetuity to a few large corporations, each having a monopoly within its district. The rates should be under direct government control, and should be fixed in such a way as to allow the operating companies from four to eight per cent. dividend, according to circumstances. This is substantially the French plan, though the details are a little different. The combination of government payment for roadbed, district monopoly of operating companies, and government control of construction and rates has been consistently tried on a large scale and with all the conditions in its favor. The results have been so bad that if Mr. Baker had been familiar with them he would not have recommended us to follow the French example. While every other country has made great reductions in rates, France remains substantially where she was twenty years ago. With a large and rich population her volume of railroad business has not developed. The normal trade incentives have been taken away: the hope of government control, to take their place, has proved illusory. Great as may be the evils of the American system, exemption from them would be dearly purchased if it involved the loss of efficiency for the present and progress in the future.

Annual Report.

New York, Lake Erie & Western.—This report is for the year ending Sept. 30. The results of operation for the year, including leased lines, are, compared with last year, as follows:

Gross Earnings.		
	1889.	1888.
General freight.....	\$13,441,460.04	\$12,212,633.48
Coal.....	7,110,790.68	8,290,098.92
Passenger.....	5,301,378.29	5,247,853.46
Mail.....	277,924.36	284,381.45
Express.....	506,374.97	508,726.73
Miscellaneous.....	366,468.67	639,235.71
Total.....	\$27,004,406.01	\$27,217,989.75
Less proportion due leased lines.....	\$ 2,409,132.74	\$2,385,169.95
Balance of revenue.....	24,595,273.27	24,832,819.80
Working Expenses.		
	1889.	1888.
Conducting transportation.....	\$7,221,458.15	\$7,263,733.87
Motive power.....	5,311,435.26	5,607,325.29
Maintenance of cars.....	2,056,914.15	1,818,748.30
Maintenance of way.....	2,777,098.26	2,843,142.34
General expenses.....	487,518.13	470,519.67
Total.....	\$17,854,424.05	\$18,003,469.47
Percentage of expenses.....	66.1167	66.1454
Net earnings.....	\$6,740,848.52	\$6,829,350.33
From other sources.....	1,076,504.64	937,810.63
Total.....	\$7,817,352.96	\$7,767,160.96
Interest on funded debt, fixed rentals, etc.....	7,042,576.51	7,028,348.44
Surplus.....	\$774,776.45	\$738,842.52

It must be remembered that the comparison is with a year of great prosperity. The gross earnings total net revenue and surplus are all greater than in any preceding year since 1884.

There were carried during the year of merchandise freight 5,706,986, being 731,563 tons and 168,936,785 ton-miles more than in 1888, 546,884 tons and 60,122,889 ton-miles more than in 1887, 908,226 tons and 149,592,408 ton-miles more than in 1886, and 1,500,739 tons and 262,545,268 ton-miles more than in 1885. The earnings per ton per mile on this traffic were .770 cent, being a decrease from 1888 of .033, a decrease from 1887 of .015; an increase of .003 over 1886, and of .066 over 1885.

The tonnage transported of anthracite and bituminous coal and coke was 9,377,146, being 821,440 tons and 64,278,619 ton-miles less than 1888, 587,988 tons and 105,678,453 ton-miles more than 1887, 1,368,988 tons and 147,549,707 ton-miles more than 1886, and 3,239,904 tons and 405,444,240 ton-miles more than 1885. The earnings per ton per mile on this traffic were .506 cent, being a decrease from 1888 of .045, from 1887 of .006, an increase over 1886 of .029, and a decrease from 1885 of .021. The decrease in the coal business is attributed to the influences which have affected all the coal carriers, principally the mild winter.

While the total tonnage of all freight hauled shows a decrease of 80,877 tons from the previous year, the movement shows an increase of 104,658,166 ton-miles over 1888, which had been up to that time the largest in the history of the company.

The total number of passengers during the year was 10,107,306, much the largest in the company's history, the increase over the previous year being 1,563,622, of which 46,882 were through passengers and 1,516,940 local. This result is largely attributable to the policy of fostering the local business of the line. The increase over 1884 is 87.6 per cent. The passenger movement also was exceptionally large, being 237,581,230 passengers one mile, an increase over 1888 of 23,506,249 miles, over 1887 of 49,473,808 miles, over 1886 of 54,376,708 miles and over 1885 of 61,637,069 miles. The rate per passenger per mile decreased to 1.639 cent, as against 1.777 in 1888, 1.939 in 1887, 1.865 in 1886 and 1.788 in 1885.

The falling off in express earnings is attributed to the war of rates between express companies; the Erie's contract with the Wells-Fargo Co. being based upon the gross receipts of the latter.

The directors urge the importance of increased facilities for handling the growing business of the road. Except for the great improvements already made in the road and equipment it would have been impossible to handle the immense business of the line for the months of July, August and September. Since Aug. 1 the road has been worked to its utmost capacity. The policy has been adopted of providing storage for coal at Buffalo and Piermont, by the use of which rolling stock can be kept moving at a somewhat uniform rate and the evil of concentrating a large part of the coal-carrying business into a few autumn months is to some extent avoided. About \$163,000 had been spent for coal-storage facilities up to Sept. 30, and it is proposed to spend \$80,000 more at once.

The engine mileage increased from 16,589,454 to 16,725,825 miles, or 0.82 per cent. Nevertheless, the cost per mile run decreased. The following figures show this in detail:

	1889.	1888.	Per cent.
Repairs and renewals.....	6.34 cents	5.50 cents	I. 15.27
Fuel.....	4.66 "	6.71 "	D. 30.55
Stores.....	0.27 "	0.33 "	D. 18.18
Engine men and firemen.....	7.15 "	7.36 "	D. 2.85
Preparing and cleaning.....	1.09 "	1.21 "	D. 9.91
Total.....	19.51 cents	21.11 cents	D. 7.58

The decrease in the cost of fuel was due largely to a less price per ton, and in a slight degree to a reduction in the consumption per mile. The consumption of coal per train mile was 97.9 lbs., against 98.4 in 1888. A saving in wages was secured by prompter train movement resulting from improved yard and siding facilities and an increase in motive power. Sixty-eight passenger engines now burn anthracite.

During the winter a contract was made with the Pullman Co. for five vestibuled trains and four dining cars, to make, in connection with the Vestibuled Pullman Equipment, a regular daily service each way between New York & Chicago. This train is in every way modern in its appliances, and represents the best work of the Pullman Co. The cost will be charged to expenses, the cars replacing old equipment sold.

The total expenditures on account of maintenance of way were \$2,081,495, an increase of \$49,459 or 2.43 per cent., the cost per mile of road being \$2,009.71, the cost per train mile 12.44 cents, to lay the additional amount of steel rail purchased. The total amount charged to steel rail was \$78,301.03, or but \$3.07 per ton on the 25,444 tons, this result being accomplished by the purchase of the new rail at very low figures, and the sale of the old iron removed from the track at the highest prices ruling during the year. The economy of such expenditures is apparent, especially when it is considered that the old steel in the main track weighs now about 60 lbs. per yard, and the new rail substituted weighs 74 lbs. The cost of all this change was all charged to expenses. During the last four years new steel rail has been laid to the amount of 73,087 tons, equal, at 74 lbs. per yard, to 628.51 miles of single main track.

In spite, however, of the unexpected and extraordinary expenses, amounting to over \$150,000, incurred by the repairs caused by the great floods of the last summer, the cost of maintenance of way was only increased \$49,459.18, as compared with the previous year. Fortunately, all the larger bridges stood.

A queer story originating apparently with an Omaha paper has had considerable circulation. It is substantially that an "oil syndicate" has long had a contract to furnish lubricating oil for the Union Pacific for a fixed lump sum. As traffic increases the quantity of oil necessary has so increased that the fixed sum does not give the "syndicate" a profit. Consequently the quantity furnished the trainmen for lubricating journals is cut down to its lowest limits and they are often instructed to "lubricate only the warm journals." The result is said to be that journals frequently "melt and break" and the conductor and brakeman are fined \$32, this being "the cost of a journal." We are told that "within two weeks four journals have melted down on the run from Omaha to Ogden, costing the employes \$128." All this, it is said, is "on account of a grasping oil monopoly." Finally, the employes are reported to have appealed to the proper officer, who will present their complaint at headquarters. We have seldom seen a more symmetrical and well-

developed yarn than this. The Omaha editor's collaborators in the train shed show a high journalistic faculty. They have yet to learn, however, the eloquence of understatement. They have drawn it a little too strong. They have made the story too complete. However, thinking that there might have been some basis for it, we have made inquiries. We are told that no trainmen of the Union Pacific have made complaints of the sort here indicated, and that the road has had no unusual trouble with hot boxes. On the other hand, up to Nov. 19 the new fast mail train had made the run three times from Omaha to Ogden, 1,034 miles, at an average speed of 44 miles per hour, including stops, with no delays whatever from hot boxes. This is the most remarkable run made in the country, and, for that matter, in the world, when distance, speed and grades are considered.

The rearranged interlocking in the yard of the Grand Central Station, New York City, was put into operation last Sunday. The changes have been radical. The new machine has 92 levers (87 working) against 116 (112 working) in the old machine. Nevertheless the duty done by it is much increased. Forty new facing-point locks, 11 switches and 10 signals have been added. The diminution in the number of levers, notwithstanding the great increase in their functions, has been made possible by the great advance made in recent years in the use of special locking and selectors. One lever in this new machine works five signals, the proper signal being "selected" by the movement of the switch, which it controls. As we have said before, in ingenuity in mechanical devices to economize room, money and labor, the Signal Engineers of the United States have probably outstripped those of England, the home of the art. A remarkable fact in the erection of this new plant is that there was no interruption of the traffic of one of the busiest stations in the world. The interlocking was out of service but four hours, from midnight of Saturday to four a. m. Sunday. The levers were not out of service at all. Nevertheless the whole plant but the tower was rebuilt—levers and frame, locking, lead-out and ground connections. The builders, the Union Switch & Signal Co., first stipulated that the interlocking should be out of service five days, but found it unnecessary to interrupt it more than four hours.

The Chicago & Grand Trunk, on Nov. 25, reduced its rates on corn to the basis of 20 cents per 100 lbs. from Chicago to the seaboard. It will be remembered that this company refused to join the other trunk lines in making this reduction three months ago, when the Baltimore & Ohio, by making large contracts on this basis, compelled the rest of its competitors to establish this discrepancy between the rate on corn and that on small grain. The Grand Trunk officers have stoutly asseverated that their decision was based on principle and the desire to treat all their customers equitably, and they now recede from it only because forced to do so by large losses of traffic. The Chicago papers state that these losses aggregate \$100,000, which we presume is intended to represent the sum of possible gross earnings between Chicago and Montreal.

The railroads of Virginia, including the Baltimore & Ohio, and the New York, Philadelphia & Norfolk, at a meeting in Richmond recently, adopted a constitution for a car service association to apply to all Virginia junction or terminal points. Major E. T. D. Myers, President of the Richmond, Fredericksburg & Potomac, was elected Chairman, and R. A. Taylor, Manager. The association is expected to begin business Dec. 1. The Toledo Car Service Association will not go into operation until Dec. 9. Akron and the territory adjacent to it will come into the Cleveland Association Dec. 16. The Cincinnati Association expects to begin business Dec. 1. The Pittsburgh & Western has issued a general demurrage circular, to take effect Nov. 25.

The Union Pacific now runs, for the Rocky Mountain News and other Denver papers, a daily newspaper train from Denver to Cheyenne, 106 miles. The News states that this vast distance will be covered with "lightning swings of the piston rod," but the time table indicates that the speed is about 35 miles an hour, which would be regarded by flippant New York newspapers as comparable only to the speed of a rat traveling through a barrel of tar. If, however, the piston rods once get to swinging, we presume the men on the train will be fully satisfied with the speed attained, and quite likely will be willing to have it reduced. The Kansas City Times has engaged a Sunday newspaper special over the same road from Kansas City, 200 miles west, which makes 40 miles an hour.

The present activity in trade is not by any means limited to the United States, as our readers know. Its effects are the same in England as here, not only in a general sense but in the particular direction of causing a scarcity of freight cars. There is a shortage of coal cars (which are also used largely for iron ore and other freight of that nature) all over the Great Britain and at a meeting of coal men in Staffordshire recently, the talk, as reported in the *Colliery Guardian*, was of precisely the

same character with which we are familiar here. It would appear that the demand for cars is not by any means of such a temporary nature there as here. It will be remembered that there are many thousand coal cars owned by coal mine proprietors and other private owners in England.

The Chicago, Rock Island & Pacific and the Atchison, Topeka & Santa Fe have substantially agreed upon (but have not yet signed) a traffic agreement by which west-bound transcontinental freight of the Rock Island will be delivered to the Atchison at Dodge City, Kan. The agreement also embraces regulations for eastbound Pacific coast traffic. Heretofore this traffic has gone chiefly to the Union Pacific, at Denver, and the Rock Island had no arrangement with the Atchison for transfer except at Kansas City, Mo., and Trinidad, Col. This is the substance of all the facts on which have been based whole columns of newspaper romance about an important agreement between the two roads referred to.

The block system is soon to be established on the Pittsburgh, Fort Wayne & Chicago between Allegheny City and Highland, Pa., a distance of 36 miles. In the vicinity of Allegheny, where numerous local passenger trains are run, the blocks will be about one mile in length, but they are gradually lengthened as the traffic decreases, and at the western extremity of this section there are some five miles in length. Freight trains are run by permissive blocking, the same as on the Pennsylvania Railroad.

"Two Readers" have written to ask what is the additional cost of vestibuling a car. This must, of course, vary greatly with the materials used and the amount of ornamentation, etc. The additional cost of vestibules will fairly range from \$400 to \$1,100. When vestibules were first put on, an ordinarily economical car-builder put \$2,000 worth of work and material into each car "without half trying."

The use of wooden or other foot-guards at frogs and other angles in the track is complicated in cold climates by the additional care required to keep the flange way free from snow in winter. This fact has led the Grand Trunk to get from the Dominion government permission to ignore the law on this matter during the winter season, from December to April, inclusive.

American Society of Mechanical Engineers—Twenty-ninth Meeting.

We continue from last week our report of this meeting.

The professional sessions were resumed at the Academy of Medicine, Thursday, Nov. 21, at 10 a. m., President Towne in the chair.

The report of the Committee on Standards was taken up, and after some amendments the resolutions and proposed bill looking to the establishment of a National Bureau of Standards were adopted in substantially the form printed in the *Railroad Gazette* of Nov. 22.

President Towne, calling Vice-President Sellers to the chair, then presented a set of resolutions, reiterating the sentiment expressed in his opening address as to the advisability of a closer union between the different branches of American engineering.

The preamble expressed the desirability of a society or organization that should be truly rational and representative without encroaching upon the autonomy of the existing organizations. The Council was directed by the resolutions to communicate the substance of the resolutions to the other societies and to appoint a committee of three to represent the society in any conference on the subject.

Dr. THURSTON said that the suggestions embodied in the resolutions formed one of the great plans urged by Alexander Holley. He secured the appointment of a committee to formulate a practical plan, but the proposed movement was not received with favor, although it was talked over for several years. The experience at the joint convention held in Europe had led to a revival of interest in the subject.

Mr. OBERLIN SMITH, as one of the European visitors, desired to offer his testimony as to the existence of a general feeling that had grown up during the trip in favor of unity, and that the chances of success in bringing about the desired result were much greater than they were a year ago.

Mr. HOLLOWAY stated that he entertained great respect for the growing American Society of Mechanical Engineers, and did not wish to see its identity sunk in a general society, as he understood was proposed. His remarks were greeted with applause.

Mr. OBERLIN SMITH said that he could not understand why such a proposed Academy of Engineering should in any sense destroy the individuality of the society.

Mr. JESSE M. SMITH, of Detroit, was heartily in favor of the resolutions, and believed their scope should be so extended as to embrace scientific societies and the army and naval engineers.

Mr. COLEMAN SELLERS said that when he applied for admission to the Institution of Civil Engineers, and expressed some doubt as to his qualifications, he being strictly a mechanical engineer, he was assured by Sir Frederick Bramhall, then President, that every one of their presidents had been mechanical engineers, and that more than three-quarters of the papers read before the Institution were devoted to dynamic engineering.

Mr. WINFIELD S. ROGERS stated that he believed the time was not far distant when the mechanical and the electrical engineer must work together in the greatest harmony.

Mr. KENT reminded the members that the American Society of Civil Engineers was preparing to enlarge its borders by taking in various local engineering bodies. He had read a paper on an Academy of Engineering before the American Association for the Advancement of Science in 1886, which was printed in Van Nostrand's magazine the same year.

It being the sense of the meeting that no decisive action was called for, but that the resolutions merely authorized the appointment of a committee of conference, a vote was called for, and they were adopted.

Papers were then presented by Fred. W. Parsons on "Indicator Rigging for Compound Engines," and by Chas. T. Main on the "Cost of Steam and Water Power."

The "General Solution of the Transmission of Force in a Steam Engine, as influenced by the Action of Friction, Acceleration and Gravity," was the subject of a paper read by D. S. Jacobus, in which he endeavored to present a set of equations involving every condition met with in ordinary steam engine practice; not for everyday use, but valuable in showing that the more approximate ones are sufficiently accurate for ordinary purposes.

In a paper on "Street Car Gear for Modern Speeds—The Coming Self-Propelled Car," Mr. S. J. McFarren stated that in the severe requirements of modern speeds and mileage, especially with self-propelled cars, those electrical engineers who had achieved the brightest success had attained it by a discriminating adaptation of devices long tried and proven on steam railroads, and future progress may be looked for in the same direction. The permanent way is so closely related to the rolling stock that improvement in the latter presupposes the first, and general recognition is already given by equipping companies and their patrons to the need of heavier rails, of stiffer section, better alignment, surface, etc.; also, that the best practice dictates grooved rails on all curves, and the elevation of the outer rail wherever the grade of street permits. The coming street car will probably comprise flexible gear with long wheel base, independent wheels on (preferably) tubular axles, and with power brakes. Its motors will be differentially connected. It will excel old practice not only in ease of riding and comfort, but will double the present life of wheels, with great economy in track, truck and motor repairs, as well as in power, lubricant, etc. This, and more, at schedule speeds of 10 to 20 miles per hour, and without sacrifice of safety, is now in sight.

The closing session of the meeting was called to order at 2:45 p. m., Nov. 21, and began with the reading of a paper by Prof. J. Burkitt Webb, on "The Comparison of Indicators."

A New Recording Pressure Gauge" was exhibited by its inventor, W. H. Bristol.

In discussion Mr. Hagne said that the use of recording pressure gauges was very important, and he did not consider any steam or water plant complete without a continuous record after the time when a certain pressure was known to have existed. Take, for instance, the case of banked fires, no one knows where the pressure goes, but with boilers set in brick it very often happens that the temperature rises during the night.

Mr. EDSON was glad to know that the importance of recorders was being appreciated. He knew of an instance in a \$750,000 office building, where the fire was banked at 6:30 p. m., and after 9 o'clock the steam began to rise because the damper regulator was hooked on. The wind was blowing and the steam continued to rise until the safety valve blew off, which continued for one and a half hours.

Mr. WOLFF thought that even if the instrument was not perfectly accurate, the fact that it could be manufactured cheaply was a strong point in its favor. Such a gauge was used as a check upon the engineer.

"How to use Steam Expansively in Direct-acting Steam Pumps" was the subject of a paper by Mr. J. F. Holloway, in which he stated that by this improvement the direct-acting steam pump has been raised to the higher, if not the highest, realms of economic duty. Of late years their economy had been somewhat increased by compounding, and some further advantage might be derived from triple-expansion cylinders; but the complication of parts, and especially the inaccessibility of pistons and packings, would seem to limit progress in that direction. The one thing lacking had been the ability to cut off the steam within the cylinder, and complete the stroke by the expansion of the remaining steam. He then proceeded to give a description of the device by which this result was accomplished.

A paper, "On the Influence of the Steam Jackets on the Pawtucket Pumping Engine," was read by Prof. James E. Denton, who gave as the results of elaborate experiments that the saving effected by the use of jackets was only three per cent., a statement which was received with no little skepticism by his hearers, among whom was Dr. Charles E. Emery, who believed that 12½ per cent. was nearer the correct figure.

Mr. OBERLIN SMITH, the newly elected president of the society, read a paper on "Graphical Analysis of Reciprocating Motions," being a system used for years by the author in practice. Its merits, he added, would not be disputed for a moment by any one who has tried it. It permits a cam to be laid out with absolute accuracy, basing its various radii upon the respective ordinates of the time line pertaining to it, and also shows the necessary proportions for a wedge, lever, toggle, etc., which may be a factor in producing the motion required. It also aids in obtaining smoothness of motion with consequent quiet running and durability, by the facility with which too sudden starts and stops become plainly visible to the eye.

The last paper of the meeting was "On the Performance of a Double Screw Ferryboat," by Prof. Denton, with an introduction by E. A. Stevens. It was based upon comparative trials between the new Hoboken ferryboat "Bergen," having a screw at each end, and the "Orange," of the ordinary beam engine type, whose hull is 11 feet longer. The practical advantages of the "Bergen" have proved to be greater beam capacity and ease of unloading. In point of handling she compares favorably with any boat on the river, her greater draught making her steady on her helm, while she can turn as readily and stop quicker, notwithstanding her greater speed. She is preferred by passengers and pilots, and while by no means perfect, is the best boat in the service, and future boats built by the company will be of the same style.

According to the programme of the meeting, the members were to make a trip on the "Bergen," Nov. 22, during which the above paper was to be read, but owing to necessary repairs to her furnaces the plan could not be carried out. In lieu thereof an excursion to Elizabethport was taken, upon invitation of the Singer Manufacturing Co., where the sewing machine factory was inspected. The trip was made on the steamer Laura M. Starin, an elegant luncheon being served through the hospitality of Prof. Henry Morton, of the Stevens Institute of Technology. Saturday morning, upon invitation of the Inman Line, the members visited the "City of Paris," and were hospitably entertained by the officers of the steamer.

The spring meeting of the society will be held at Cincinnati, O.

TECHNICAL.

Locomotive Building.

The Schenectady Locomotive Works have recently completed some heavy 10-wheel freight engines for the Houston & Texas Central.

The Evansville & Terre Haute has ordered seven new engines from the Pittsburgh Locomotive Works, to be delivered Jan. 1.

The Cumberland Valley has recently received two new six-wheel freight locomotives.

The Kentucky & Indiana Bridge Co. last week ordered one passenger engine from the Baldwin Locomotive Works.

H. K. Porter & Co., of Pittsburgh, have just shipped a 19-ton shifting engine to the United States navy yard at Washington, D. C., and a similar one to Dilworth, Porter & Co., of Pittsburgh. The firm has also recently shipped noiseless steam motors to San Francisco, Cal., and Aniston, Ala., and is building similar motors for Tacoma, Wash., and Elmira, N. Y. Several coke oven engines and a number of steel works engines are being built.

Car Notes.

The Pullman Car Works have been awarded a contract to build 3,000 gondola and twin hopper coal cars for the Philadelphia & Reading.

Pardee, Snyder & Co., of Watsontown, Pa., have been awarded the contract for 250 box cars by the Central of New Jersey.

Contracts for the construction of 2,000 new coal cars were let last week by the Lehigh Valley to builders along the line of that road.

The Kingston & Pembroke has made an agreement with the Dominion government to build 200 cars for the Intercolonial road, at its shops at Kingston, Ont. The company is also building 150 cars for its own road.

The Royal City Planing Mills Co., New Westminster, B. C., has shipped during the season 2,000,000 ft. of dimension lumber to the Barney & Smith Mfg. Co., of Dayton, O., for car-building purposes.

The Indianapolis Car & Mfg. Co. this week commenced work on a contract to build 500 box and 250 coal cars for the Lake Shore & Michigan Southern, and will complete them at the rate of 20 day.

The Monterey & Mexican Gulf received 400 box, platform and stock cars this week, and 12 locomotives have been shipped from Paterson, N. J.

The Centropolis Car Co. at Centropolis, Mo., has recently completed a number of cars for the Kansas City & Southern.

Twelve charcoal cars are now being built at the Minneapolis shops of the Minneapolis, St. Paul & Sault Ste Marie shops. These cars are 33 ft. long, 8 ft. 1½ in. wide, and 8 ft. 4 in. high from top of sills to plate.

The Burlington & Missouri River has contracted for 2,000 new freight cars, which will be delivered about Feb. 1.

The following cars are now under construction at the United Rolling Stock Co.'s works at Hegewisch, Ill. All the passenger cars for the Monterey & Mexican Gulf and for the Hidalgo roads of Mexico; 350 drop-bottom gondolas for the Pennsylvania Co.; fruit cars for the Georgia Southern & Florida; box, stock and platform cars, hopper gondolas and cabooses, and one wrecking car for the Hidalgo road, and 30 cabooses for the Georgia Pacific. The company has just finished 32 passenger cars for the Alabama Midland, and 300 fruit cars for the East Tennessee, Virginia & Georgia.

Bridge Notes.

The contract for the superstructure of the remaining half of the steel arch bridge at Minneapolis, Minn., to take the place of the present suspension bridge, has been let to the Wrought Iron Bridge Co., of Canton, O., for \$72,881.

The superstructure of the new bridge across Duck River at Columbia, Tenn., was awarded last week to the Pittsburgh Bridge Co. There were 21 bids.

A new bridge over the Grand River at Portland, Mich., is to be built at a cost of \$85,500.

The appropriation of \$30,000, voted by the board of works of Montreal, Que., toward the Sherbourne Street Bridge, has been approved by the city government. The cost of erecting the bridge will be \$50,000, and the land damages will probably reach \$45,000. The city has also appropriated \$14,000 toward the cost of bridges over the railroads at Dundas street and College avenue. The approximate cost of the bridges is \$38,000.

The Potomac Bridge Works have purchased a lot near the tracks of the Baltimore & Ohio and Pennsylvania roads in Frederick, Md., with a frontage of 600 ft. The company proposes to at once commence erecting buildings for the manufacture of iron highway and railroad bridges. Machinery has already been ordered. It is claimed that the buildings will be under roof by Jan. 1, and ready for contracts early next spring. H. G. Welty, of Ohio, is at the head of the enterprise.

Proposals are wanted until Dec. 2 for furnishing plans and constructing an iron bridge over the Colorado River at Bastrop, Tex. R. L. Batts is Secretary of the Bastrop Bridge Co., which has been organized to build the bridge.

All the new iron bridges over the Monocacy River contracted for by the County Commissioners of Frederick County soon after the great flood in June last have been completed, with the exception of the Georgetown bridge near Frederick Junction. The entire cost will be over \$100,000.

Bids will be received by the Commissioners' Court on Dec. 16, in Austin, Tex., for the repair and completion of the bridge across the Colorado River at Montopolis Ford, near Austin. Bids will be received for either stone or tubular piers. J. M. Brackenridge is the County Judge.

The Mayor of Lowell, Mass., has been authorized to sign an agreement with the Locks & Canals Co. providing for rebuilding, with iron, the bridge across the Merrimac street canal.

It is understood that the Board of Selectmen of Wareham, Mass., will construct a bridge across Swift's River.

The work of excavating for the piers of the bridge over the Belly River, at Lethbridge, Alberta, has been commenced.

The contract for constructing an iron bridge over Reed's Creek at Tehama, Cal., has been awarded to the Pacific Bridge Co., of San Francisco, at \$6,480.

The County of Rockbridge, Va., may build two bridges, one near Goshen and one near Riverside, over the South River.

Gen. Casey, Chief of Engineers, has detailed a board of engineer officers to meet at Ceredo, W. Va., and examine the site of a bridge proposed to be built across the Ohio River at that point by the West Virginia & Ironton (Norfolk & Western) Railroad.

The Pittsburgh Bridge Co., of Pittsburgh, will, in the spring, erect a two-story building, 50 x 200 ft., for a machine and pattern shop. The firm has a large number of orders to replace the bridges over the Conemaugh River that were swept away by the Johnstown flood.

A new railroad bridge, a short distance below the present one, is in course of construction over the Gunpowder River, on the Maryland Central. It will be about 15 ft. higher than the present bridge, and wide enough for a standard gauge road.

The Canadian Pacific will build a double-track trestle bridge, with a 60 ft. span, at McGregor's Creek, near Ottawa, Ont.

A temporary injunction has been granted against the construction of the Missouri Pacific viaduct on Central avenue, in Kansas City, Kan., upon the petition of property holders abutting on Central avenue, who claimed that the value of their lands would be greatly lessened by the building of the viaduct.

A charter has been issued to the Charleston & South Side Bridge Co. for the purpose of constructing a toll bridge across the Kanawha at Charleston, W. Va. The sum of \$50,000 has been subscribed to the capital stock. B. L. Wood, Jr., of Pittsburgh, has been elected President, and L. Prichard, of the Charleston National Bank, Treasurer.

The City Council of Jacksonville, Fla., has voted a board of public works \$80,000 to be used in paying the city's portion of the cost of the viaduct over the railroads on Bridge and Commercial streets, Jacksonville, Fla.

The Central Bridge Works, of Peterboro, Ont., have the following work under construction: Five spans of bridges for the Napanee, Tamworth & Quebec; five spans for the Canadian Pacific; two spans highway bridges for the municipality of Wardsville, Ont.; one span for the Burleigh Bridge, and one span for the township of Haldimand. The company is working on 4,000 ft. of 48-in. diameter steel pipe, 90 48-in. flexible joints, and 20 60-in. flexible joints. The contracts for the two latter items will amount to about \$25,000. Orders have been received for the following work: 304 ft. 72-in. pipe, three spans of highway bridges for Chatham, Ont.; one span for the crossing of the Des Jardines Canal, at Hamilton, Ont.; four spans of bridges for the Grand Trunk, and for considerable iron roof work.

Manufacturing and Business.

The Whitaker Iron Co., of Wheeling, W. Va., is putting in an electric plant, which will comprise 30 lights of 2,000 candle power each. The Westinghouse system has been adopted.

The Aina Machine Co. has closed a contract with the Lancaster Iron Co. for a 600 H. P. engine for the new plant at Lancaster, Pa.

The Dominion Government has called for tenders for the following works: For a large pier, 300 ft. long, at Grand River, Gaspe, Que., estimated to cost \$25,000; a large pier and 12,000 yds. of dredging at Southampton, Bruce County, Ont., estimated to cost \$25,000; a pier at St. Simeon, P. Q., estimated to cost \$6,000.

Albert B. Bowman, of St. Louis, reports the following among recent sales: One 27 in. by 10 ft. Lodge & Davis lathe, one pin machine for locomotive pins, one large railroad screw machine, one 1½ in. double national bolt cutter, one 5 ft. Bement radial drill, one 12 in. slotter, and one 48 in. car wheel boring machine.

The contracts have been let for building the new Union station at Seventh and Water streets, Louisville, Ky., to be built by the Chesapeake & Ohio, and used as a union station for the seven lines now entering the city. McDonald Bros. are the architects. The new station is to cost about \$500,000. The contracts were awarded to the following: Blatz & Krebs for the stone work; Osborne, Sims & Co., terra cotta; Jacob Meriwether, brick work; F. J. Brocar, painting; Mike Ford, plastering, and Sneed & Co., iron work.

Notice of incorporation has been filed in Porter County, Indiana, by the Indiana Natural Gas & Oil Co., organized in Chicago with a capital stock of \$2,000,000. The directors are Patrick A. McEwan, John D. Cohrs, Anocito Hoyos, Frederick S. Winton and Robert C. Bell. The company proposes to pipe natural gas from Indiana to Chicago.

The National Paint Works, of Williamsport, Pa., are now producing about 10,000 barrels of asphaltum paint per year, for use on nearly 500 railroads. They use the natural asphalt, which is obtained by skimming the surface of a lake in Trinidad. This material, when mixed by their peculiar processes, with lead, zinc and oil, forms an elastic and glossy paint of great tenacity, especially suitable for car, bridge and station work.

The St. John Dock & Harbor Improvement Co. is applying for a charter, the capital stock being placed at \$225,000. The company proposes to construct dry docks, together with wharves and warehouses, at the port of St. John, N. B. The incorporators are: Jean Felix and U. O. Crane, New York; Thomas Cochrane, Philadelphia; Cornelius Beard, of Boston; James C. Robertson, of the Harris Car Works, St. John, N. B.; William Von Slooten, of New York; James Leary, John H. Parke and F. E. Baker, St. John.

The total liabilities of the Polson Iron Works, at Toronto and Owen Sound, Ont., now in liquidation, will be \$220,000. Of this \$104,000 is due to the Ontario bank, and \$3,500 to the Bank of British North America. There is \$80,000 due the trade. Both the banks claim to be amply secured. The assets show a considerable surplus. The directors will finish the contracts, on which they say there is a good margin. The estate will then be wound up. A new company may possibly be formed, which will purchase the plant. The company has a capital stock of \$125,000 but this was unequal to the work that the contracts called for. The works consisted of a large engine, boiler and machine shops at Toronto, and an extensive shipyard in Owen Sound, and the capital stock was insufficient to fit out these and meet incidental expenditures; and although considerable credit was granted by the banks, the margin was too limited to permit of the handling of the contracts which the company had secured.

Iron and Steel.

The Carbon Iron Co., of Pittsburgh, is erecting eight reducing furnaces. Including two Lash open-hearth furnaces and buildings, hydraulic cranes, ladles, machinery, etc., the improvements being made will cost nearly \$100,000. The additions will give the firm a daily capacity of about 200 tons of open-hearth steel ingots. This company furnished all of the universal plates and eyebars for the Merchants' Bridge at St. Louis, in all about 3,000 tons, the eyebars being among the heaviest which were ever put into a bridge.

The Leechburg Foundry & Machine Co. has made recent shipments of its alloy rolls to the following: Pullman Iron Co., Blandon Rolling Mill Co., Cohoes Rolling Mill Co., Lindsay & McCutcheon, Coatesville Iron Co., Keystone Rolling Mill Co., Schenckkill Haven Iron Co., and Crown & Cumberland Steel Co.

The Clinton Iron & Steel Co., operating the Clinton and Millvale Mills, of Graff, Bennett & Co., at Pittsburgh, is making some extensive repairs and remodeling the Clinton blast furnace. This furnace was built in 1850, and is 45 x 12, but the company will increase the size to 72 x 14½.

The rolling mill at Laramie, Wyo., has secured orders for all fittings for the rails to be used in the construction of the Cheyenne & Northern and in changing the Utah & Northern to standard gauge.

Notices have been posted in all the mills of the Glasgow Iron Co., near Pottstown, Pa., announcing an increase in the wages of puddlers of 25 cents a ton. The men have been getting \$3.50, and will hereafter receive \$3.75. Wages of all other employes will be correspondingly increased.

The wages of the employes at the blast furnaces of the E. & G. Brooke Iron Co., Limited, at Birdsboro, Pa., have been advanced 10 per cent. The Warwick Iron Co., of Pottstown, Pa., has granted a similar advance to its furnace employes.

A. Phemer, of Cincinnati, has been appointed Receiver of the Etna Iron Works, of Scranton, O.

The Attala furnace at Attala, Fla., has sold out to the Southern Iron Co. for \$200,000, including the company's mineral lands. The Southern Iron Co. will, it is stated, build a second furnace at Attala.

Robert Coleman, Esq., of Lebanon, Pa., has contracted with Gordon, Strobel & Laureau, of Philadelphia, for extensive improvements at his North Cornwall anthracite furnaces, including two plants of Gordon fire-brick stoves.

Work is progressing on the two furnaces being erected at McKeesport, Pa., by the Monongahela Furnace Co., and it is expected to have them completed early in July. They will have a capacity of at least 200 tons per day each. The furnaces are to be 20 x 80 equipped with seven stoves of the Cowper-Kennedy type, five E. P. Allis & Co. blowing engines, 42 in. steam cylinders, 84 in. air cylinders, 60 in. stroke. The boilers will be 32 in number, all steel, 54 in. in diameter, 30 ft. long, with two 18 in. flues.

D. R. Lean, engineer and contractor at Pittsburgh, has received a contract for the erection of three heating furnaces for the Lane Bridge & Iron Works at Chicago, to be used for heating eye-bars for bridge work. Mr. Lean is also engaged in remodeling the Bessie Furnace of the Columbus & Hocking Coal & Iron Co. at New Straitsville, O. Three Whitwell stoves will be replaced by three of the Cowper-Kennedy design. The old stoves were 38 ft. in height, while the new ones will be 52 ft. high.

The Morehead-McCleane Co., proprietors of the Soho Iron & Steel Works, at Pittsburgh, is erecting a new sheet mill, which, when completed, will greatly increase its capacity. The firm is also remodeling its old armor plate mill, introducing reversing rolling mill engines which will about double the tonnage of the plant.

The Roanoke Iron Co., which proposes to erect a 150-ton iron furnace at Roanoke, Va., has let contracts as follows: To McClure & Ainslie, of Pittsburgh, Pa., to erect the furnace, to be 17 ft. at its base and 82 ft. high, four hot blast stoves, each 18 ft. in diameter and 60 ft. high, and 11 steam boilers 5½ ft. in diameter and 30 ft. long; to the Robin-Rea Mfg. Co., of Pittsburgh, Pa., for two upright blast engines with 84-in. blast cylinder and 12-in. steam cylinder, and to the Wilson-Snyder Mfg. Co., of Pittsburgh, Pa., for improved pumps. The contract for the cast-house and boiler house was previously let to the American Bridge & Iron Co., of Roanoke.

Interlocking.

New interlocking signals have been put in at Tonawanda, N. Y., at the crossing of the Erie's lumber branch with the New York Central's main tracks, at the crossing of the Erie's Niagara Falls Division with the New York Central's Lockport Branch, and at the crossing of the Erie's Niagara Falls Division with the New York Central's Canandaigua Branch.

Continuous Steam Heating.

The St. Louis, Alton & Springfield has contracted with the Martin Anti-Fire Car Heating Co. to equip its passenger engines and coaches.

The Western New York & Pennsylvania has adopted the Gold system of car heating. The plain pipe system will be used as shown in the Gold Co.'s new supplement catalogue.

Collarless Axle.

The New York & New England has been making a trial of a set of collarless axles under a passenger locomotive tender without the use of end frames on the trucks. After running 40,000 miles the journals, brasses, collars and end stops are in excellent condition and the truck is in good alignment. The experience is so satisfactory that the road contemplates a further use of the collarless axle on common trucks.

Passenger Cars on the New York & New England.

The New York & New England has just put into use some new passenger cars of the most modern design. The finish is modest and not trying to the eye. Some of the peculiarities of construction are the use of double windows for the sides of the car, made of French plate glass; mineral wool lining between floors, and trucks with collarless axles 4½ in. by 8 in. The weight of these cars is about 66,000 lbs.

The Eames Air Pump.

We are informed that the Eames Vacuum Brake Co. has perfected and is now manufacturing an air equipment for locomotives. Cuts are in preparation and we expect shortly to illustrate and describe the new Eames air pump, which is said to be simple, substantial and very economical. It is said that this pump will be put on the market at once at a reasonable price. The Eames company also proposes to furnish driver brakes to be operated either by steam or air when desired.

The Standard Metre.

The International Committee of Weights and Measures, recently in session at Paris, has ordered the construction of standard metre measures, of platinum, for distribution to the different governments which have authorized the use of the metric system. These standards are to be carefully tested by the International Committee before issue.

The Grand Narrows Bridge.

The Dominion Bridge Co., which is building the long railroad bridge at The Narrows, Cape Breton, has just launched a second scow to be used in floating the spans to position. These scows are each 91 ft. long, 20 ft. wide and 6 ft. 7 in. deep, and are estimated to float 300 tons with a good freeboard, and are the largest ever built in the Lower Provinces. Something like 100,000 feet of timber is used up in their construction. After a span is erected on two temporary wharves, the scows are filled with water, placed under the ends, then pumped out, lifting the span clear of the wharves. The scows are then towed out between two piers and allowed to fill. As they sink the span rests on its place on the piers.

THE SCRAP HEAP.**Notes.**

The city of Cincinnati has officially adopted Central standard time. The city clocks have heretofore indicated 22 minutes ahead of the standard.

Thirteen passenger conductors on the Missouri, Kansas & Texas were suddenly "given their resignations" Nov. 22. The report says that "two of them were transferred from freight to passenger conductors on the occasion of the general let out a few months ago."

Frederick A. Hall, a locomotive engineer of the Chicago, Burlington & Northern, has recovered a verdict of \$40,000 in a suit against the company for damages sustained by him in a collision with a switch engine at St. Paul a year ago. A brakeman on the Louisville & Nashville, who was permanently crippled in a fire resulting from a leak in an oil barrel, has obtained a verdict for \$25,000 damages against the Standard Oil Co. An appeal will be taken.

Committees of New York Central freight trainmen and engineers have had long consultations with the general officers at New York City during the past week, over the large amount of extra time they have to put in without pay on account of the delays to trains entering the West Albany yard. It is stated that the company has agreed to pay the men by the hour for all time over 12 hours daily. The rate is said to have been five cents an hour less than the men at first demanded.

Passengers on the evening trains between Chicopee Falls and the Junction [Connecticut River Railroad] are not sighing for cars lighted by electricity, for the new fashion of not reversing the engine for the short trip makes the head-light shine in at the forward door with a constant, dazzling glare that is uncomfortably suggestive to the untrusting.—*Local Paper.*

The C. R. should get some head-light curtains. Too many fares are collected from the class of persons mentioned to admit of the continuance of any practice that will tend to drive them away.

Kentucky Railroad Taxes.

The Railroad Commissioners have completed their assessment of the railroads in the state for 1889, and are now preparing their annual report. The total mileage in Kentucky, Jan. 1, 1890, is estimated, will be 2,820 miles—an increase of about 200 miles over last year. The total taxable valuation of the roads, excluding a part which is exempt by law for a number of years, is \$40,869,913, and the taxes to be collected on this amount, at 47½ cents on \$100 valuation, is \$161,988. Of this total amount the L. & N. pays the state in taxes \$75,226.

The Rotary Snow Plow in New Mexico.

The use of the Colorado Midland's rotary snow shovel on the Denver, Texas & Fort Worth seems to have created a mild sensation. A local paper says: "It was put to work in a big cut where the snow was about 20 ft. deep and made excellent headway, throwing an avalanche of snow 50 ft. into the air at every revolution of the great plow, which literally bored itself through a mass as compact as sand. When about the centre of the cut a strange sight was witnessed. Those who were standing on either side of the plow were suddenly deluged with a shower of beef steaks. On all sides fell porterhouse, sirloin, round steaks, small steaks, shoulder steaks, with occasionally a slice of liver or a nicely cut rib roast. It was thought at first that the engine had left the track and was boring its way through a butcher shop. Investigation, however, disclosed the fact that a herd of Texas cattle had crowded into the cut and had frozen and been buried in the drifts. Manager Meek immediately declared that no well-regulated road should be without a rotary snow plow."

Concessions for Railroads in Peru.

The following laws have been passed by the Peruvian Congress and promulgated by the Executive:

First—Conceding to bondholders in fee simple 2,000,000 hectares (810,000 acres) of unoccupied land, to be selected by them, on the coast or inland, the settlers being free from all contributions, and every facility to be offered for the profitable working of the land.

Second—Conceding to the bondholders the exclusive right to build a line of railroad from the terminus of the Oroya Railroad or any of its branches to a point on any of the navigable tributaries of the Amazon, with the right of free navigation thereof, and the cession of 6,000 hectares (2,430 acres) of land for each kilometre (.62 mile) of railroad built.

Third—Conceding to the bondholders the right to build a line from Puno to the Desaguadero to connect the Southern railroads with the new Bolivian railroads, by which two-thirds of the entire traffic of Bolivia will be controlled.

Bolivia guarantees six per cent, on the cost of the railroad from La Paz to the Desaguadero to connect with the Southern system of Peru.

Railroading on the Water.

The transfer steamers "Groton" and "Thames River," whose use at New London, Conn., was discontinued by the New York, Providence & Boston Road, at New London, Conn., on the completion of the bridge, have been sold to go to Baltimore. The "Groton" will be the companion boat to the "Garrett" in carrying Locust Point & Ohio passenger and other trains between Locust Point and Canton. The "Thames River" will be employed at harbor transfer business for the railroad company, but the reports say that it is also intended for the Baltimore & Eastern Shore Railroad service across the bay from the terminus, in Talbot County, to Thomas' Point, in Anne Arundel County. This Eastern Shore

Railroad will soon be ready for business. It will connect with Baltimore by way of the Annapolis & Baltimore Short Line, which will have a terminus at Thomas' Point.

The new freight transfer steamboat "Express," belonging to the Pennsylvania Railroad, has just been put in service at New York. The "Express" was built by Harlan & Hollingsworth, is 288 ft. long, 64 ft. beam, has three tracks and can carry 19 of the longest freight cars. She will run between Jersey City and Wilson's Point, Conn., connecting there with the Housatonic. In her trial trip on the Delaware she made 35 miles in one hour and 56 minutes.

Robbers and Wreckers.

The Missouri, Kansas & Texas express train, northbound for St. Louis, was "held up" on Pryor Creek, near Perry Station, I. T., on Sunday night last, and the express car robbed of about \$50,000. The road agents were only two in number. They had concealed themselves in a clump of bushes near the water tank on Pryor Creek, and when the train stopped for water boarded the engine, uncoupled the express car from the rest of the train, and forced the engineer to haul the car some distance while they cleared the safe. The express messenger seems to be under suspicion.

Fifteen masked and heavily armed men boarded the southbound Santa Fe passenger train on the night of Nov. 25, at Berwyn, a small station in the Chickasaw Nation, Ind. Ter., and cut the engine and mail and express car loose from the coaches. They then ran the train two miles and threw the fireman off the locomotive. Two miles further on the engineer was thrown off, and after running four miles further the steam was shut off and the locomotive "killed." Then the robbers began an attack on the express car. The guard and messenger fired 20 shots, but finally gave in after the robbers had literally riddled the car. The money stolen is between \$20,000 and \$30,000, and came principally from Chicago. United States marshals are in pursuit of the robbers.

The section master of the New York, New Haven & Hartford at Windsor Locks, Conn., discovered ties placed across the track in six different places near the bridge over the Connecticut River one night this week. The discovery prevented what might have been an ugly disaster.

The Influence of Scalpers.

The magnitude of the financial interests which are often at stake in railroad transactions which superficially appear simple, is a matter of every day observation. One instance is the value of a passenger to a road when there is competition for him. A ticket seller can be hired for \$40 a month, but if he can get a bid for his services and influence from a rival road, he may command ten times that sum. Some stories about scalpers indicate that this ratio often is even much larger than that. The latest gossip in this line is to the effect that Chairman Walker is negotiating with a ticket broker to turn his guns upon his brethren. The story is thus told in the Western papers.

The Interstate Commerce Railway Association is considering a plan of attack upon the scalpers which is novel and liable to be fruitful of good results. It is well known that for some time past the presidents of the Western roads have not rested easily under the charges of close affiliation with scalpers, and have been trying to devise ways of breaking up the business. While there is now less scalping being done by the connivance of the roads than at any time for many years, still a vast amount of the passenger traffic is controlled by the brokers. The scheme is to create a commissioner of passenger traffic, who shall be an officer of the Interstate Commerce Railway Association. It is proposed to turn the commissioner of passenger traffic loose on the roads that are dealing with scalpers, and on the scalpers also, with a view to breaking up the entire business. The fact is recognized that no ordinary railroad man can fill the bill, and E. A. Mulford, of Chicago, ex-President of the American Ticket Brokers' Association and the king bee of scalpers and ticket brokers generally, is the man who is being considered as the proper person to fill the position. Mulford is one of the best ticket brokers in the country and an A1 passenger man. He has been in the business 16 years, and has amassed a fortune of over half a million dollars. The Rock Island never made an artistic slash in rates, the Chicago & Alton has never cut its competitors deep under the fifth rib but that Mulford was first consulted. He has enjoyed the confidence and the annual passes and other favors of nearly every road in the country, including at times the white-winged Pennsylvania. Mulford is rich, young and able, and he realizes that scalping has got to go, and in addition has a personal grievance to satisfy. He was the chief agent in building up the American Ticket Brokers' Association, and always fought the admission of Hebrews. The Hebrews, however, forced their way in, and when Mulford abandoned the ticket brokerage business last summer, the Hebrews, who had secured a majority in the association, dropped Mulford's name, and refused to reinstate him when he re-opened his office this fall. Mulford went down to Louisville and made a fight before the association for reinstatement a few days ago, and was again shut out. Now he is willing to shut out the entire fraternity, and he is certainly possessed of information as to the plan of campaign which would enable him to make a very healthy fight. It is said that Mulford can have the position if he will take it at \$12,000 a year, but that in view of what he alone has made, and especially that his profits last year were \$50,000, he considers his services worth more than \$12,000. It has been suggested that Mulford be authorized to name his own salary, conditional on the success of his efforts.

General Railroad News.**MEETINGS AND ANNOUNCEMENTS.****Dividends.**

Dividends on the capital stocks of railroad companies have been declared as follows:

Catawissa, 3½ per cent, on the preferred stock, payable Nov. 19.

Chicago & Northwestern, semi-annual, 3 per cent, on the common stock, and quarterly, 1½ per cent, on the preferred stock.

Delaware & Bound Brook, quarterly, 2 per cent., payable Nov. 19.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alberta Railway & Coal Co., special, London, Eng., Dec. 2, to consider agreements entered into with other companies.

Chicago, Kansas & Nebraska, special, Topeka, Kan.,

Dec. 3, to consider a trackage agreement with the Kansas City & Beatrice.

Colorado Midland, special, Colorado Springs, Colo., Dec. 31, to act upon a proposed lease of the Rio Grande Junction.

Concord & Montreal, annual, Concord, N. H., Dec. 18.

Denver & Rio Grande, special, Denver, Colo., Dec. 31, to act upon a proposed lease of the Rio Grande Junction.

Fort Worth & Denver City, annual, Fort Worth, Tex., Dec. 10.

Hudson Tunnel, annual, 2 Nassau street, New York City, Dec. 17.

Manitoba & Southeastern, annual, Winnipeg, Man., Dec. 10.

Richmond & West Point Terminal, annual, Dec. 10.

Santa Fe Southern, annual, Santa Fe, N. M., Dec. 9.

South Atlantic & Northwestern, special, 147 Times Building, 40 Park Row, New York City, Dec. 12.

South & North Alabama, annual, Montgomery, Ala., Nov. 30.

Tennessee Midland, annual, Memphis, Tenn., Dec. 4.

Texas, Santa Fe & Northern, annual, Santa Fe, N. M., Dec. 9.

Wheeling & Lake Erie, annual, Toledo, O., Dec. 19.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The Northwest Railroad Club meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The American Society of Civil Engineers holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will be held at the American House.

The Western Society of Engineers holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The Engineers' Club of St. Louis holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the house of the Club, 1,122 Girard street, Philadelphia.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at the Club rooms, No. 24 West Fourth street, Cincinnati, at 8 p. m., on the fourth Thursday of each month.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the Fourth Tuesday of the month.

The Engineers' Club of Kansas City meets at Kansas City, Mo., on the first Monday in each month.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Club of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Engineering Association of the Southwest.

We announced last week the organization of this association. At the meeting of Nov. 21 the following officers were elected: President, John McLeod, Louisville, Ky.; First Vice-President, W. F. Foster, Nashville, Tenn.; Second Vice-President, Edwin Thacher, Deatur, Ala.; Secretary, Olin H. Landreth, Nashville, Tenn.; Treasurer, W. L. Dudley, Nashville, Tenn. Directors from Tennessee, E. P. Clute, South Pittsburg, Tenn.; Niles Meriwether, Memphis, Tenn.; W. C. Smith, Nashville, Tenn. From other states, J. H. Adams, Birmingham, Ala.; A. V. Gude, Atlanta, Ga.; Wm. Starling, Greenville, Miss.

Regular meetings will be held on the second Thursday of each month at Nashville unless otherwise ordered by the association at a previous meeting. Until the permanent quarters are fitted up the association will hold its meetings in the Assembly Rooms of the new Y. M. C. A. Building on Church street, Nashville.

New York Railroad Club

A regular meeting of this club was held at the club rooms, 130 Liberty St., New York, Nov. 21, Mr. C. E. Geary, President, in the chair.

The President announced that Mr. Boies had been unable on account of business engagements to prepare a paper on steel-tired wheels which he had promised. He spoke of the death of Mr. D. A. Hopkins, who had been a member and earnest supporter of the club as well as of the old Master Car-Builders' Club. He suggested the appointment of a committee to draw up suitable resolutions. The President appointed on this committee Messrs. C. A. Smith, R. C. Blackall and J. H. McGraw.

The club then proceeded to the election of officers for the ensuing year, with the following result: President, Ross Kells, Superintendent of Motive Power New York, Lake Erie & Western Railroad; First Vice-President, Robert C. Blackall, Superintendent of Motive Power and Machinery Delaware & Hudson Canal Co.; Second Vice-President, W. L. Hoffecker, Superintendent Motive Power Central of New Jersey; Secretary, Lewis R. Pomeroy, Secretary and Treasurer Suburban Rapid Transit; Treasurer, C. A. Smith, Executive Committee; H. Tandy, New York, Ontario & Western; H. A. Webster, Manhattan Elevated; J. W. Baker, Delaware, Lackawanna & Western; Thomas Mellen, New York City & Northern; Thomas Aldcorn, West Shore; E. B. Wetmore, Suburban Rapid Transit; W. H. Lewis, Delaware, Lackawanna & Western; W. C. Ennis, New York, Susquehanna & Western; H. S. Hayward, Pennsylvania.

Mr. Coolbaugh then spoke of the future policy of the club. He said that it was the opinion of many members that quarters should be procured further up town. He thought it was the spirit of the club that a more con-

venient location should be found, and that the affairs of the club should be carried on in the future with more energy than has been shown recently. Various members spoke to the same effect.

A resolution of thanks to the retiring officers was passed.

It was voted to omit the December meeting in order to give the newly elected officers time to prepare for the January meeting.

PERSONAL.

—Mr. Chandos S. Stanhope, of the railroad contracting firm of Hampson & Stanhope, has been elected Second Vice-President of the Mexican National, an office just created.

—Mr. J. B. Conners, who for seven years past has been Master of Transportation of the Toledo, Ann Arbor & Northern Michigan road, has been appointed General Superintendent of the line.

—Mr. J. V. Creighton has resigned as traffic manager of the Oregon & Washington Territory road, and that office has been abolished. W. F. Wamsley has been appointed General Freight Agent of the road.

—Mr. W. O. Sheldon, Secretary and Treasurer of the Marden Car Brake Co., of Boston, has resigned, and will engage in the lumber business in Tennessee. He will be succeeded by Mr. Alvan H. Rogers, of Boston.

—Mr. James Menzies has resigned his position as Assistant General Freight Agent of the Florida Central & Peninsular, with which road he has been connected for six years, holding several positions in the traffic department.

—Mr. James Bruce has been appointed Superintendent of the Toledo Division of the Toledo, Columbus & Hocking Valley road, and E. A. Wright has been appointed Superintendent of Telegraph and Car Service of the same company.

—Col. D. C. Rowland has been appointed General Superintendent of Transportation on the Central of Georgia, to succeed Capt. E. L. Tyler, who has been appointed General Manager of the Atlanta & West Point and the Western of Alabama.

—Mr. A. J. Vanlandingham, Assistant General Freight Agent of the Kansas City, Fort Scott & Memphis, has resigned that position to become Commissioner of the Kansas City Transportation Bureau, recently organized by the Kansas City Commercial Club.

—Mr. Joseph Hood, formerly Assistant Engineer of the Southern Pacific, and a brother of Mr. William Hood, Chief Engineer of the road, died in Long Beach, Cal., Oct. 29, aged 37 years. Mr. Hood had his skull fractured in an accident about two years ago, and he has since been a most intense sufferer.

—Mr. George C. Smith, Chief Engineer of the Chicago, Burlington & Quincy, has resigned to become Chief Engineer of a projected road in Uruguay. Mr. Smith has been in the service of the Chicago, Burlington & Quincy since 1868. He has been Assistant Chief Engineer, Acting Purchasing Agent, and since June, 1883, Chief Engineer.

—Mr. W. J. Haylor, formerly Master of Trains on the Mobile & Montgomery, but for the last two months Superintendent of Transportation of the Alabama Midland, has been appointed Superintendent of the Columbus & Western Division of the Central of Georgia, to succeed Mr. W. H. McClintock, resigned, who has been Superintendent of this division since April.

—Mr. M. E. Schmidt, formerly Chief Assistant Engineer of the South Pass Jetties, and Chief Engineer of the Tampico Division of the Mexican Central Railway, has opened an office at "The Rookery," in Chicago. He will do a general engineering business, with special attention to the Abt system of rack railroad and to municipal engineering.

—Mr. J. C. Stubbs has resigned his office of Second Vice-President of the Chicago, Milwaukee & St. Paul, to return to his former place as Traffic Manager of the Southern Pacific. Mr. Stubbs resigned from the Southern Pacific while Mr. Huntington and other executive officers of the company were in Europe. When they returned they held a conference with Mr. Stubbs and induced him to return to the Southern Pacific.

—Mr. H. A. Johnson has resigned his position as General Freight Agent of the Kansas City, Fort Scott & Memphis, which he has held for about two years, and will return to the Union Pacific as Assistant General Freight Agent at Denver to succeed Mr. J. B. Keeler, who has resigned to accept other employment. Mr. Johnson was previously Assistant General Freight Agent of the Union Pacific at Omaha before he became General Freight Agent of the Union Pacific.

—Mr. Theodore D. Kline, General Superintendent of the above road, has been appointed General Manager, to succeed Major John F. O'Brien, resigned. Mr. Kline has had extensive railroad service, particularly on Southern roads, in the United States. He was in charge of transportation and machinery on the Wilmington, Columbia & Augusta from 1874 to July, 1877, and has since been Superintendent of the Charlotte, Columbia & Augusta from July, 1877, to November, 1879; Superintendent of the Richmond & Petersburg from 1879 to April, 1882, Superintendent of the Georgia Division of the East Tennessee, Virginia & Georgia from April to October, 1883, and Superintendent of the Southwestern Division of the Central of Georgia from 1883 until August, 1888, when he entered the service of the Mexican National as Superintendent of the Northern Division. He was appointed General Superintendent last June.

—Mr. R. J. Elvin, of Indianapolis, Ind., has, according to the *Journal* of that city, one of the most remarkable records for long continuous service on one road that we remember to have seen. The *Journal* says:

"This city can claim among its residents the oldest active railroad man in the West, and probably the oldest in the United States. He is R. J. Elvin, of No. 888 North Illinois street. He began with the Madison road as a clerk for the contractors in constructing the line in May, 1839, and continuing, has remained with the Jeffersonville, Madison & Indianapolis until the present, over half a century. Mr. Elvin was nearly 28 years old when he went to work for the first company, and will be 79 years old on the third of January next. He has been clerk, station agent, collector, paymaster, and is now special agent, goes out on the road every week, and is as hale and active as a well-preserved man of 60. He has only lived in this city little more than a year, having removed here from Madison. "For nearly 50 years," said Mr. Elvin, "I lived within 80 yards

of the track, and at no time, during more than 45 years, have I been beyond the sound of a locomotive bell. I have traveled over the road more than 2,000 times, was never in a wreck or collision or any accident except once, when the engine ran over a cow, and another time when descending the inclined plane at North Madison the cog-wheel got out of order and punched a hole in the lower side of the boiler. I was on the tender, and being enveloped in steam, dropped and rolled down an embankment. I felt a little sore next day, but lost no time from the office. With these two exceptions, I never met with any mishaps or received any scratch or bruises when on the train."

ELECTIONS AND APPOINTMENTS.

Annapolis & Baltimore Short Line.—The annual meeting of the stockholders of the company was held at Clifford Station, Md., Nov. 20. The old board of directors was re-elected as follows: J. S. Ricker, George Bermham, Jr., W. W. Brown, F. E. Fennessey, E. Wallace, W. C. Haskins and J. H. Smith, of Portland and Boston; John Glenn, Baltimore; Joseph B. Seth, Easton, Md. J. S. Ricker was elected President.

Boston & Providence.—At the annual meeting in Boston, Nov. 26, the old board of directors and officers were re-elected.

Chicago, St. Paul & Kansas City.—George Lyndon has been appointed Freight Auditor of the road with headquarters at St. Paul.

Columbus, Shawnee & Hocking Valley.—The following officers have been elected: President, D. S. Gray; Vice-President and General Manager, F. T. Picard; General Passenger and Freight Agent, W. W. Daniel; Auditor and Assistant Treasurer, C. A. Covert. The headquarters of the company will be at Columbus, O.

Des Moines & Northern.—The following officers have been elected: A. R. Cummings, President; L. M. Martin, Secretary; R. L. Chase, Treasurer. These and Carroll Wright and F. M. Hubbell are the directors.

East Tennessee, Virginia & Georgia.—At the annual meeting, held at Knoxville, Tenn., last week, the following directors were elected: John H. Inman, Samuel Thomas, Charles M. McGhee, Galvin S. Brice, John G. Moore, Thomas M. Logan, Edward J. Sanford, W. S. Chisholm, John Greenough, William L. Bull, George Coppell, John H. Hall, Evan Howell, George S. Scott and George J. Gould.

Evansville, Suburban & Rockport.—The incorporators of this Indiana company are W. J. Wood, Lee Howell, D. J. Mackey, J. W. Cook, William Heilman and others.

Fort Worth & Albuquerque.—The following are the officers of this Texas company: Charles C. Black, of Kansas City, President; J. W. Zook, Fort Worth, Tex., Vice-President; and W. C. McFarland, of Kansas City, Secretary.

Fountain Head.—The following officers have been elected: F. A. R. Scott, President; J. C. White, Vice-president, and C. H. Brown, secretary and treasurer.

Interoceanic.—The following are the officers of this company: G. A. Wilson, Manager; Edmund B. Forbes, Chief Engineer, London; A. L. Alexander, Chief Engineer for the contractors and Resident Engineer for the company; T. W. Morcom, General Freight and Traffic Agent; Delfin Sanchez, Director General. Delfin Sanchez & Co., Winchester House, London, are the financial agents.

Iowa Central.—James Mahoney has been appointed Assistant General Freight Agent, with office at Marshalltown, Ia.

Lake Shore & Michigan Southern.—H. P. Latta has been appointed Master Mechanic of the Toledo division, with headquarters at Norwalk, O., to succeed J. M. Sanborn, resigned.

Louisville & Nashville.—B. H. Epperson, Superintendent of the Mobile & Montgomery division, has been appointed Superintendent of the Louisville, Cincinnati & Lexington division, in place of J. C. Loomis, resigned, with headquarters at Louisville, Ky. J. T. McKinney, Master of Trains of the Birmingham Mineral, has been appointed Superintendent of the Mobile & Montgomery division, to succeed B. H. Epperson, transferred.

Louisville, New Orleans & Texas.—Capt. A. A. Sharp, heretofore Superintendent of Transportation, will be Superintendent New Orleans Division, headquarters at Vicksburg, Miss.

Mexican National.—Chandos S. Stanhope has been elected Second Vice-President, with office in the City of Mexico, and will assume the duties Dec. 1. T. D. Kline has been appointed General Manager to fill the vacancy caused by the resignation of Maj. John F. O'Brien. The appointment takes effect Dec. 31, when the office of General Superintendent will be abolished.

Milwaukee, Menomonee Falls & Western.—A. H. Hadfield, of Waukesha, Wis., is the Treasurer and Purchasing Agent of this Wisconsin company, and William Powrie, of Templeton, Wis., is Chief Engineer.

Monadnock.—The twenty-first annual meeting of stockholders was held Nov. 19. The old board of directors was re-elected, except that H. S. Marcy, of the Fitchburg, takes the place of E. R. Phillips, resigned. At a subsequent meeting of the directors, H. K. French was re-elected President and J. H. Cutler, Clerk.

New York, Lake Erie & Western.—At the annual meeting of the road in New York, Nov. 23, the following board of directors was elected without opposition: John King, John G. McCullough, Ogden Mills, J. Lowber Welsh, William Whitewright, William A. Wheelock, Henry H. Cooke, George W. Quintard, William Libbey, Corlandt Parker, Morris K. Jessup, James J. Goodwin, William L. Strong, William N. Gilchrist, Josiah Belden, M. F. Reynolds, S. M. Felton, Jr. For this ticket there were voted 570,000 shares of stock, common and preferred, and \$30,000,000 of bonds, representing 300,000 shares of stock.

Ohio Southern.—D. H. Roche has been appointed General Passenger Agent of this company, vice H. M. Bronson, resigned. The office of the General Passenger Agent will hereafter be located at Springfield, O. A. E. Tremp has been appointed Master Mechanic, with office at Springfield, O., vice John King, resigned. John Diddott has been appointed Roadmaster, with office at Springfield, O., vice John Sloan, resigned.

Old Colony.—At the annual meeting in Boston, Nov. 23, the following directors were elected: Charles F. Choate, of Southboro; Frederick L. Ames, of Easton; Thomas J. Borden and John S. Brayton, of Fall River;

Samuel C. Cobb, George A. Gardner and James R. Kendrick, of Boston; Thomas Dunn, of Newport; Charles L. Lovering, of Taunton; William J. Rotch, of New Bedford; John J. Russell, of Plymouth; Nathaniel Thayer, of Lancaster; and Royal W. Turner, of Randolph. The old officers were re-elected.

Oregon & Washington Territory.—Mr. J. V. Creighton having resigned as Traffic Manager, that office has been abolished. W. F. Wamsley has been appointed General Freight Agent, with headquarters at Walla Walla, Wash.

Richmond & Chesapeake.—Officers have been elected as follows: President, Charles W. Mackey, of Franklin, Pa.; Vice-president, C. E. Belvin, of Richmond; General Manager, Henry H. Trenor; Resident Counsel, H. A. Atkinson, Jr.; Chief Engineer, Oliver W. Barnes, 57 Broadway, New York. The directors are: C. W. Mackey, C. E. Belvin, Horace B. Fry, Willis Barnes, New York; L. F. Bossieux, Richmond.

Southern Pacific.—J. J. E. Lindberg has been appointed Division Superintendent of the Shasta division of the California & Oregon Line, with headquarters at Redding, Cal., vice A. F. George, who resigned to go into business at Los Angeles. Mr. Lindberg was formerly Division Superintendent at El Paso.

St. Louis & San Francisco.—E. L. Fay has been appointed Acting Superintendent of the St. Louis division in place of A. Veech, resigned.

Tavares, Orlando & Atlantic.—T. M. T. McKennan having resigned the position of General Manager, that office has been abolished, and W. B. Tucker has been appointed General Superintendent, with headquarters at Orlando, Fla.

Union Pacific.—H. A. Johnson has been appointed Assistant General Freight Agent, with headquarters in Denver, to succeed J. B. Keller, resigned.

Wilkesbarre & Williamsport.—The following are the directors of this Pennsylvania company: W. P. Ryman, President; J. R. Bedford, Ira E. Hartwell, F. C. Sturgis, H. A. Fuller, F. W. Wheaton, E. Troxell and A. S. Orr, of Wilkesbarre; George F. Nesbitt, of Kingston, and Gustave E. Kessell and Joseph W. Ogden, Morristown, N. J.

Wilmington, Columbia & Augusta.—At the annual meeting in Wilmington, N. C., Nov. 20, the stockholders elected the following officers: President, Hon. W. T. Walters, of Baltimore; Secretary and Treasurer, James F. Post, Jr., of Wilmington; Directors, Hon. W. T. Walters, H. Walters, G. C. Jenkins, Enoch Pratt, G. L. Brown, B. F. Newcomer, of Baltimore; H. B. Plant, of New York; J. T. Barron, of Columbia, S. C. and H. Short, of Lake Waccamaw.

Wilmington & Weldon.—The annual meeting was held in Wilmington, N. C., last week. The following were elected directors: W. T. Walters, B. F. Newcomer, H. Walters, Michael Jenkins and J. P. McCay, of Baltimore; H. B. Plant, of New York; Donald MacRae and Dr. A. J. DeRosset, of Wilmington; W. H. Willard, of Raleigh; E. B. Borden, of Goldsboro, and the Hon. George Howard, of Tarboro, N. C. The directors re-elected the following officers: President, B. F. Newcomer, Baltimore; Vice-President and General Manager, H. Walters, of Wilmington; Assistant General Manager, John R. Kenly, of Wilmington; Secretary and Treasurer, James F. Post, Jr.; General Superintendent, Jno. F. Divine; General Freight and Passenger Agent, T. M. Emerson, and Engineer of Roadway, B. R. Dunn. The same officers were elected for the Florence, Manchester & Augusta and Wilmington & Weldon roads.

OLD AND NEW ROADS.

Astoria & South Coast.—Two hundred men are at work grading this new Oregon road. The company is negotiating for 500 Chinese laborers. Grading is now completed to the Necanicum and O'Hara Creeks, and work on the bridges will be commenced at once.

Atchison, Topeka & Santa Fe.—At a meeting of the Board of Directors, held Nov. 23, the following preamble and resolution were unanimously adopted:

"Whereas, The stockholders of the company have provided for the necessary funds to meet the requirements of the company, subject to the terms of Circular No. 63, and, Whereas, The holders of a majority of all the outstanding bonds of the system, both in Europe and the United States, have assented to the plan of reorganization, dated Oct. 15, 1889; Therefore, be it voted, That the said plan of reorganization be and is hereby declared effective, and that official announcement of this fact shall be made by the chairman, accompanied by notice that bondholders to secure participation in the benefits of the plan should deposit their bonds on or before Dec. 15, 1889, and that after that date bonds will only be received under such equitable conditions as the Board of Directors may establish. It is understood that the deposits of bonds in London have amounted to \$18,000,000.

Birmingham Mineral.—Tracklaying has commenced on the Red Gap branch from Gate City to Graces, Ala., 10 miles. The survey of the Dudley Mines branch, from Milldale on the south end to the Standard Coal Co.'s mines, has been commenced, and the track will be laid as soon as possible. The company will also build a branch line from a point near Osmore to the Eureka mines of the De Bardeleben Coal & Iron Co. The branch will be about three miles long.

Birmingham, Sheffield & Tennessee River.—Four hundred men and 75 teams are employed in grading the extension from Jasper, Ala., south to Hewitt station, on the Georgia Pacific, a distance of 9½ miles. Three miles of the grading is now finished, and the extension will probably be completed and opened for traffic by March 1. Tracklaying is to begin about Dec. 1. The work is generally heavy, the maximum grade being 80 ft. to the mile and the maximum curves six degrees. A further extension south from Hewitt is contemplated, but as yet nothing definite has been decided upon. Fudge & Strang, of Kansas City, Mo., have the contract for the grading and masonry on the section now under construction, and Ford & Mason, of Jasper, Ala., have the bridging. A. Mitchell, of Jasper, is Engineer in charge of construction.

Burlington & Missouri River.—Tracklaying on the branch of the Republican Valley & Wyoming, from Culbertson, Neb., toward Holyoke, Col., which was commenced last October, has been suspended, and the efforts to have the charter of the branch annulled have been renewed by the towns along the line, who claim that the company does not intend to build the line and is trying to prevent other roads from building over the route.

Canadian Pacific.—Fifteen miles of track remains to be laid on the Detroit extension of the Ontario & Quebec road, and if the weather remains favorable all the track will be laid next week. Ballasting is well advanced, and will be entirely finished simultaneously with the completion of the tracklaying. It is expected that the line will be in full running order next month.

Major Bowles, of Winnipeg, has secured the contract for the improvements to be made to the Canadian Pacific track between Winnipeg and Port Arthur. The work embraces rock cutting, filling and bridging, and will take nearly a year to complete.

Cape Fear & Cincinnati.—This company has asked bids for grading the road. The proposed route is south from Wilmington, N. C., to the city of Southport, N. C., thence west to and into South Carolina, and north-west to connect with the roads leading to Cincinnati and Chicago. There is no difficult work, it being all earth excavation. The maximum grade is one per cent., and the maximum curve six degrees. The right of way for the first 75 miles has been already granted, and the city of Southport has deeded the use of a number of streets and several hundred feet of water front on the harbor, which is seven miles from the Atlantic. Vessels drawing 22 feet of water can now come in over the bar, which is being deepened so that vessels drawing 25 ft. of water can enter. Orders for rolling stock are under advisement now. The capital stock of the company is \$2,000,000, and it is proposed to bond the road for an amount not exceeding \$15,000 per mile. George B. Morton, Neal Building, Baltimore, Md., is Vice-President and Chief Engineer.

Central of New Jersey.—Grading has been commenced on the extension of the Atlantic Highlands branch from Atlantic Highlands to the shore of North Shrewsbury River. It is expected to have the extension completed and in operation early next spring.

The New York & Highlands Railroad which built the division from Keyport to Hopping Junction, N. J., six miles, is to be foreclosed and will be bought in by the Central of New Jersey.

Chattanooga Southern.—Surveys are still in progress on this road and the location has now been nearly completed to McLeomore's Cave, Ga., and will probably be continued from that point to Alpine, Ala. It is understood that the Chattanooga Union has obtained control of the road and that it will push the construction of the line immediately and have it completed as early as possible.

Chicago, Kansas & Nebraska.—Three months ago the Metropolitan Trust Co., of New York, began an action in the United States Circuit Court of Kansas to foreclose a mortgage of over \$25,000,000 on this road. All except \$2,500,000 of the capital stock of the road is held by the Chicago, Rock Island & Pacific. This \$2,500,000 represents the holdings of various Kansas municipalities which bonded themselves in that amount and received stock in payment to aid the construction of the road. A foreclosure would naturally injure these stockholders, and their representatives this week obtained from Judge Brewer of the United States Circuit Court an order that they become parties to the suit.

Chignecto Marine.—The prospectus has been issued in London for the first issue of \$225,000 sterling, five per cent. mortgage debenture bonds of the Chignecto Marine Transport Co. The issue price is £108½. It is stated that it is certain that the capital will be subscribed, as the interest on the debentures is secured by the Dominion subsidy.

Columbia River.—This company seeks incorporation in Canada to construct a road from the Columbia River southwesterly to the Spelmacine River, British Columbia.

Columbus, Shawnee & Hocking Valley.—The Columbus & Eastern and the Shawnee & Muskingum River roads have filed articles of consolidation in Ohio under the above name. This company was incorporated late in October, and will build about 11 miles of road from a point on the Columbus & Eastern, near Saltville, O., to a point on the Shawnee & Muskingum River, near Sagars, F. J. Picard, of Columbus, is General Manager.

Denver, Texas & Fort Worth.—The presidents of this road and of the Union Pacific are given as authority for the statement that the lines from Denver to Fort Worth and the proprietary lines of the Union Pacific in Colorado are to be virtually consolidated by the sale of a majority of the stocks to a new company which is to be formed by Union Pacific interests. No details are published.

Duluth & Winnipeg.—Tracklaying on the extension from Cloquet, Minn., northwest, was completed to the Mississippi River last week. The road is now completed and in operation 18 miles from Duluth. The construction work will be suspended for the winter, but will be resumed in the spring.

Evansville Suburban & Rockport.—This company has been organized in Indiana to build a road from Rockport, Ind., along the river to Newburg, connecting with the present Evansville Suburban & Newburg road now in operation. The road is a "dummy" line.

Fort Worth & Albuquerque.—Mallory, Cushing & Co., of Omaha, Neb., have been awarded the contract for building the first 100 miles of this road from Fort Worth, Tex., northwest toward Albuquerque, N. M. Charles C. Black, of Kansas City, Mo., is president, and J. W. Zook, of Fort Worth, is vice-president.

Fountain Head.—William Neighbour & Co., of Olive Springs, Tenn., and Simpson & Hall have the contract for grading this road from Knoxville to Fountain Head, Knox County, Tenn., a summer resort about six miles from Knoxville. F. A. R. Scott is President and C. H. Brown is Secretary and Treasurer.

French Broad Valley.—The company has asked the City of Asheville, N. C., to subscribe \$2,000 to its capital stock to be used in building the proposed road from Asheville south to a point in Transylvania County. The New York Mining & Construction Co., of which Charles G. Dyott, 52 Wall street, New York City, is President, has the contract for building the line.

Georgia Pacific.—The grading and tracklaying on the Tallahatchee branch of this road from Itta Bena, Miss., to Hobson's Bayou, a distance of 42 miles, will be completed by Feb. 15 next. The work is light and grades are ½ per cent., and curves are three degrees. Gibson & Corpening, of Birmingham, are the contractors.

Gettysburg & Harrisburg.—The surveys for the extension from Round Top Mountain to the city of Washington, which were begun last spring, are still in progress, and have reached Union Mills, Md.

Grand Tower & Cape Girardeau.—Ballasting on this road is now nearly completed, and it is expected to have the line in operation in a few days. It is 25 miles long, and extends from Grand Tower, Ill., south to Cape Girardeau, Mo., following the east side of the Missouri River, and passes through the counties of Jackson, Union and Alexander, in Illinois. The grading is light, the maximum grade being ½ percent. The maximum curvature is two degrees. B. F. Johnson & Co. are the contractors; P. R. Van Frank, Cape Girardeau, Mo., is Chief Engineer.

Houston & Texas Central.—On the application of bankers, who claim to hold \$74,000 of this company's securities, the New York Supreme Court has granted a temporary injunction restraining the Central Trust Co., of New York, the Houston & Texas Central, C. P. Huntington and others from issuing bonds and filing mortgages under the plan of reorganizing the Houston & Texas. It is alleged that certain mortgages made by the Houston & Texas Central were foreclosed and the property bought in by the Central Trust Co. It is also alleged that the foreclosures were collusive and in the interest of the Southern Pacific; that there was no justifiable ground for the foreclosures; that the stockholders were told that they could come in under the reorganization scheme, but that after the foreclosures it was announced that they could only come into the new scheme upon the payment of 73 per cent. upon each share of stock held by them.

Hutchinson & Southern.—Grading is now in progress from Kingman, Kan., south to the Indian Territory line, about 48 miles, and it is expected to have this section completed and in operation by Feb. 1 next. The road is now completed from Hutchinson, where it connects with the Chicago, Rock Island & Pacific, south 32 miles to Kingman. It is proposed to build an extension from Hutchinson north 27 miles to McPherson, where a connection will be made with the Union Pacific. An issue of bonds to the amount of \$400,000 has been made on the completed road between Hutchinson and Kingman, and these are now being placed in New York.

Intercolonial.—New rails have been laid down on this road for a length of 40 miles in the Metanopia valley. F. F. Miller, engineer, of Montreal, has obtained the contract for building the steel bridge at the station at River du Loup. This bridge will be 350 ft. long and will cost \$25,000 or \$30,000. Reservoirs are to be erected along the line at St. Pierre, St. Helene, River du Loup, Hadlow and St. Charles, of a capacity of 50,000 gallons each.

Interoceanic.—Joseph Hampson, El Paso, Tex., O'Donnell, Motz & Co., Velasquez y Gayol, of the City of Mexico, and Brinkman & Turnbull, of Mexico, are the contractors on the 186 miles of this road now under construction. A large number of men are at work and the line is being rapidly finished. No further contracts for grading will be let at present. A large portion of the road is being built by the company. It starts from Vera Cruz and extends through the important city of Puebla to the City of Mexico, and from thence it is proposed to extend it to the Pacific coast at Acapulco. The work is heavy, and from Vera Cruz ascending by grades of 2½ per cent., and curves of minimum radius of 100 meters, to the central plateau, or table-land of Mexico, at a level of 8,000 ft. above the sea. The nature of the work will be correspondingly heavy on the descent to the Pacific coast at Acapulco. On the 186 miles now being constructed there are 700 bridges and culverts, most of these with iron girders. The largest span on the work is 60 metres. All orders for rolling stock for the present have been completed or are now in execution in England and the United States. G. A. Wilson is Manager and A. L. Alexander is Resident Engineer.

Kansas City, Arkansas & New Orleans.—Grading on the division of this road, from Beebe, Ark., to Monroe, La., was commenced recently at Stuttgart, Ark., on the St. Louis, Arkansas & Texas. Grading was being finished at the rate of two miles a day.

Kansas City, Wyandotte & Northwestern.—The extension from Summerfield, Kan., northwest to Beatrice, Neb., will be completed in a few days; this line will connect with the Union Pacific, the Chicago, Rock Island & Pacific, and the Chicago, Burlington & Quincy. The extension is known as the Kansas City & Beatrice, and extends from Summerfield to Virginia, Neb., 22 miles, the company having running rights over the Chicago, Rock Island & Pacific to Beatrice, 14 miles from Virginia.

Kearney, Hutchinson & Gulf.—This company has been organized in Nebraska to build a road from Kearney to Red Cloud, and thence south to Hutchinson, Kan.

Lindsay, Bobcaygeon & Pontypool.—This company is asking the Dominion Government for a charter to build a road from Pontypool, on the Canadian Pacific in Durham County, Ont., south to Lindsay and north to Bobcaygeon.

Linville Improvement Co.—This company is having surveys made for a proposed road from Cranberry to Linville, N. C., a distance of 13 miles. Hugh McRea, of Linville, N. C., is President. J. R. Irwin, of Linville, is Chief Engineer.

Macon & Birmingham.—J. S. McTighe & Co., of Memphis, Tenn., who have the contract for building this extension of the Georgia Southern & Florida, have sublet 60 miles, as follows: To Daniel T. Hartnett, of Memphis, Tenn., 15 miles; to McLaughlin Bros., of Macon, Ga., Hays Bros., of Kansas City, Kan., Southerland & La Rue, of Jasper, Ala., W. S. O'Kief, of Kansas City, Kan., Andrews Bros., of Florence, Ala., J. B. Lewis, Mt. Vernon, Ill., P. J. Coffman, of St. Louis, Mo., Garvey & Birmingham, of Kansas City, Mo., 5 miles each; to W. H. Brooks & Co., of Macon, Ga., S. A. Campbell, of Memphis, Tenn., and N. P. Nelson & Co., of Belleville, Ill., 3 miles each; and to Frank Hallingsworth, of Macon, Ga., 2 miles.

Maryland Central.—Surveys for changing the gauge of the road to standard are being made, and it is expected that the work will begin very soon.

Mexican Central.—Tracklaying upon the Tampico division of the road has been resumed, and will probably be completed within two months. The grading will be finished Jan. 1.

Mexican Gulf, Pacific & Puget Sound.—The locating survey will soon be started for this road, and it is stated that arrangements have been made for building the line from Pensacola, Fla., to York, Ala., before next summer.

Mexican Pacific.—Charles Thorntown has been awarded a contract for constructing nearly 300 miles of

this road from Tonalá, State of Chiapas, on the Pacific Coast, toward Frontera, State of Tabasco. Construction work is now in progress, and is being rapidly completed.

Michigan Central.—The road has now a double track from Windsor, Ont., to Maidstone Cross, 10½ miles, and will immediately commence to extend the double track from Maidstone Cross to Essex Centre, a distance of 1½ miles. One hundred men will be put on the work.

Midland Transit.—The company has nearly completed the arrangements for building its proposed road, which was chartered in Florida last September, to extend from Rochelle through Melrose to a connection with the Georgia Southern & Florida in Clay or Bradford county. The line will be about 17 miles long. H. G. Payne and Robert W. Davis are directors.

Milwaukee & Northern.—A survey is now being made from a point near Iron Mountain to Sidnaw (Hill Creek), Mich., where the Ontonagon branch of the road makes a junction with the Duluth, South Shore & Atlantic. The line if built would be 40 miles long, and it would connect the main line with the Ontonagon branch. At present trains run over the Duluth, South Shore & Atlantic from Champion to Sidnaw.

Milwaukee, Lake Shore & Western.—The extension of the Rhinelander branch has been completed from Lac du Flambeau, Wis., northwest to Hurley, a distance of 41 miles. The extension considerably shortens the line from Milwaukee to Ashland.

Milwaukee, Menomonee Falls & Western.—The greater part of the grading on this road has been completed, and it is expected to have it all completed and the tracklaying finished by Dec. 15. The eastern terminus of the road is Granville, Wis., where it connects with the Chicago, Milwaukee & St. Paul, and the Chicago & Northwestern. The route is westerly to Menomonee Falls, where the Menomonee River is crossed on a trestle bridge 160 ft. long. From there southwest to Templeton, where connection is made with the Wisconsin Central, and across the last named road overhead on a wooden trestle bridge 700 ft. long, and thence to Sussex, the present terminus of the road. The distance is 12 miles. The work to be done is comparatively light, with maximum grades of 100 ft. to the mile and maximum curves of 10 deg. The contracts are all let except for rolling stock. A. H. Hadfield, Waukesha, Wis., is Secretary and Purchasing Agent and W. Powrie, of Templeton, is Chief Engineer.

Monterey & Mexican Gulf.—Tracklaying on this road has reached a point 78 miles southeast of Monterey, Mex. The construction is being rapidly completed from the end of the track to Tampico, 350 miles from Monterey, northwest to Venadito, a distance of 67 miles. The line will be opened to Lenares, 91 miles from Monterey, this week. Wm. Wentworth, of Monterey, is Chief Engineer.

Montreal & Western.—The company has filed notice with the Canadian Parliament, and asked its confirmation of an agreement dated Oct. 15, between the Montreal & Western and the Canadian Pacific companies for the lease by the latter of the former road, as soon as completed from Ste. Jerome, Que., to Le Desert, 70 miles. The Canadian Pacific is to begin operating each section as completed, not waiting for the finishing of the entire line before putting on trains.

New York, New Haven & Hartford.—Surveys have been completed for the proposed branch from Watertown southeast to Woodbury, Conn., a distance of six miles. It is stated that grading will soon be commenced.

New York, Ontario & Western.—It is regarded as quite probable that this road will pass into the control of the New York Central & Hudson River road in a short time. It is known that a letter is in circulation among the stockholders of the road, requesting them to send their proxies to Mr. Cornelius Vanderbilt, to be used by him in electing, at the next annual meeting, Jan. 22, a board of directors who shall be in harmony with the New York Central & Hudson River road. This letter is the result of a movement among the stockholders themselves, a large number of whom indorsed it before it was sent out to others. It has been in circulation a comparatively short time, but has already brought a large number of signatures and proxies, and many more are expected.

Surveys are in progress for a proposed extension of the Delhi branch from Delhi northwest, about 15 miles, to Bloomville, N. Y., where a connection will be made with a branch of the Delaware & Otsego division of the Ulster & Delaware.

Norfolk Southern.—The Circuit Court of the United States for the Eastern District of Virginia has appointed Watson B. Dickerman Receiver of the Norfolk Southern, which extends from Norfolk, Va., to Edenton, N. C., 74 miles.

Old Colony.—The stockholders at their annual meeting in Boston, Nov. 23, voted to increase the capital stock to \$15,000,000. The increase is to provide means for new extensions and other permanent improvements. These are to be paid for by the proceeds of the bonds and stock, and the stock will be sold in the open market. It was also voted to authorize the directors to issue bonds to an amount not exceeding \$1,000,000 to provide for the building of local branches, and that the fiscal year be changed to end June 30, the annual meeting to be held on the second Tuesday in September.

Ohio, Indiana & Western.—A petition was filed in the United States Circuit Court at Indianapolis, Nov. 23, to again place this road in the hands of a receiver. The complainant is the Central Trust Co., of New York, which represents the first mortgage bondholders of the road, who oppose the transfer of the road to the Cleveland, Cincinnati, Chicago & St. Louis. In the complaint it is averred that the bonded indebtedness is \$8,500,000, of which bonds for \$5,000,000 were given preference with the stipulation that in case of a sale of the property they were to have priority in the application of proceeds of sale or foreclosure. The suit is based on the allegation that the mortgage security is inadequate, and that interest has not been paid on \$6,500,000 of the unpreferred bonds secured by first mortgage.

Oneida, Oneonta & New York.—The locating survey of this road has been completed from Oneida, southeast to Oneonta, N. Y., a distance of about 65 miles. It is claimed that New York parties have contracted to take the road as soon as completed and furnish rolling stock and operate it, and guarantee six per cent. to the builders.

Orlando and Winter Park.—Three miles of grading has been completed on the extension of this road from Oviedo to Osceola, Fla., a distance of 10 miles. Track-

laying will be commenced about Dec. 1, and completed a month later. The work is light, with maximum grades of one per cent. and maximum curves of four degrees. All the right of way has been secured for the extension, and the city of Orlando has voted a donation of \$10,000. J. H. Abbott, of Winter Park, is Chief Engineer and contractor.

Ottawa & Gutineau Valley.—Five hundred men are working three miles north of Chelsea, Que., and 300 men have been started at work at grading within a mile of Hull, and it is expected that within a month the Canadian Pacific station, at the latter point, will be reached. On this section there is a good deal of rock to be encountered. There is also considerable rock work on the three miles on the other side of Chelsea, and considerable difficulty is experienced in grading. The next five miles of the road north is nearly all cleared, and grading will begin soon. All the heavy work will be performed during the coming winter, and the light work will be finished in the spring. The road is being built from Ottawa north along the Gatineau River through Hull and Chelsea. H. J. Beemer, of Montreal, is President.

Pacific, Chehalis & Eastern.—Surveyors are at work locating this road between Chehalis, Wash., and Shoalwater Bay. Another party is expected to start soon for the Cowlitz Pass to work from there eastward.

Palatka & Anclote.—W. E. McKay has a contract for grading on this road, and about 150 men are at work. The work is not difficult. The road is to extend from Palatka, Fla., on the St. John River, to Anclote, on the Gulf of Mexico, and it is claimed that it will be completed between these points next year. W. H. Wren, 15 Cortlandt street, New York, is President, and W. E. Strong, Palatka, Fla., is Chief Engineer.

Pennsylvania, Poughkeepsie & Boston.—Andrews & Warner, 202 Broadway, New York City, have been awarded the contract for the extension of this road from Slaton, on the Lehigh River, southwest to Harrisburg, Pa., on the Susquehanna River. It is expected to have the line completed in ten months.

Philadelphia & Reading.—The claim of the road that it could construct its elevated terminal line in Philadelphia and cross the streets of the city, without obtaining the consent of the City Council, has been denied by the Common Pleas Court. The company has decided to take the case to the Supreme Court for a final decision of the right to build under the company's charter, but it will make a further application to the Council for its consent to cross the streets upon such reasonable conditions as are suggested by the spirit of the Court's decision, and according to the plans filed in that case.

Philadelphia & Sea Shore Short Line.—Two hundred men and 60 teams began grading on this road at Cape May, N. J., this week. It is claimed that the road will be completed between Sea Isle City and Winslow Junction early next May.

Port Arthur, Duluth & Western.—The Dominion government has approved the location of this road. The Railway Committee has assented to two level crossings of the Canadian Pacific at Port Arthur and Fort William, Ont., respectively.

The company is asking the Canadian Government for an amendment to its charter to construct a branch line to Kalkabeka Falls, Ont., and also to extend the time for the completion of the present line.

Port Townsend.—The final locating survey for this road has now been finished from Port Townsend south to Lake Hooker, a distance of 20 miles, and it is now being pushed south of that point. It is claimed that this 20 mile section will be completed before spring.

Pueblo, Silver Cliff & Wet Mountain Valley.—The preliminary survey for this line has been completed from Pueblo, southwest by west, to the summit of the Wet Mountains, and to Greenwood and Silver Cliff, a distance of about 70 miles. When the party of engineers reached the summit of the mountains they were caught in the recent snowstorms, which continued until Silver Creek was reached. The snow was on an average two feet deep, and the party suffered very much. A. M. Welles, of Denver, is Chief Engineer.

Qu Appelle, Long Lake & Saskatchewan.—Grading on this road was suspended last week. One hundred and thirty-two miles of the road is graded, which brings the line within nine miles of Saskatoon.

Rio Grande & Junction.—Cory Bros. & Co., of Ogden, Utah, who have the contract for constructing this road from Rifle Creek to Grand Junction, 63 miles, have sublet part of the work to the following contractors: David Grant, from Rifle Creek seven miles; Sweeney & Nelson the next two miles; Bean & Sanford, the next 10 miles, to a point four miles below Parachute; Bartlett Bros., the next four miles; the next section has not been sublet, but several sections below it have. A large number of men are at work and there seems to be no doubt but that the work will be completed by March 1, as called for in the contract.

Rome & Decatur.—Judge R. T. Dorsey, receiver of the road, which was to have been sold in New York City Nov. 20, says that by request of the Committee of Bondholders the sale of the road has been postponed until Dec. 18, when it will be sold in New York.

San Antonio & Aransas Pass.—The locating survey for the proposed extension from Kennedy southwest to Laredo, Tex., 135 miles, has been completed to a point within 30 miles of Laredo, and will probably be finished to that point early next month. Grading will probably also commence before Jan. 1.

San Francisco & North Pacific.—A preliminary survey is reported in progress for an extension of the road north to Gaytonville, Mendocino County, to some point in Humboldt County.

Southern Coal, Iron & Railroad Co.—A company of this name is being organized in Boston to engage in mining and railroad construction. The roads which it proposes to build will aggregate about 400 miles, and are to be known as the Blue Ridge system. They are outlined as follows: From Asheville, N. C., west to Waynesville and Charleston, Swain County, N. C., thence along the Little Tennessee River to the Tennessee State line at Chilhowee. From this point three lines are projected: one southwest to Athens, Tenn., another north via Marysville to Knoxville. The third is from a point on this line between Marysville and Chilhowee northeast to Levierville and Dandridge to Morristown, Tenn. From Charleston, N. C., a line is proposed southeast via Webster to Greenville, S. C. The company proposes to purchase several short existing roads between some of these points, and run them as part of its outlined system.

Little surveying has yet been done, but it is stated that so far as it has been finished, an easy grade has been found, though the work will be difficult, and there will be many bridges. One tunnel 1,300 ft. long will be necessary. The company claims that construction will begin Jan. 1. The idea is to form an almost direct line from Baltimore to Atlanta, and other Southern points. The company will have a capital stock of \$1,700,000, and \$600,000 more is expected to be raised along the route. W. Colcord is Secretary, and L. C. Wolkins is Chief Engineer, at 74 Tremont street, Boston.

St. Louis, Iron Mountain & Southern.—The extension of the Kansas & Arkansas Valley Division from Wagoner, I. T., northwest to Coffeyville, Kan., 82 miles, was opened for regular passenger and freight traffic, Nov. 21. The extension has been finished for some months, but various delays have occurred to prevent the opening of the line for traffic.

St. Louis & Illinois Central.—The St. Louis & Chicago, which is now being reorganized, will be known as the St. Louis & Illinois Central when the reorganization has been completed. There is some opposition to the plan of reorganization among the bondholders, and a meeting was held last week at which bonds to the amount of \$681,000 were voted in favor of the present plan, and \$270,000 were voted in opposition to it.

St. Paul, Minneapolis & Manitoba.—Judge Patterson, in the Supreme Court, Chambers, New York City, has denied the motion made by Frank C. Hollins for an injunction restraining this company from carrying into effect a plan of transfer to the Great Northern Railroad Co. The Judge says that the plan was adopted by the stockholders at the last annual meeting, the holders of more than three-fourths of the stock being in favor of the plan. The complainant was not a stockholder at the time, but between Oct. 31 and Nov. 11 bought 500 shares, which had been voted in favor of the plan. Since the adoption of the plan the stockholders have subscribed for stock of the Great Northern to the amount of \$16,323,000 out of a total capital of \$20,000,000. The property is largely in Minnesota, and the judge holds that it is properly a case for the Minnesota courts to decide.

Temiscouata.—It is expected that the three engineering parties which are now surveying a line from Edmuntston to Moncton, to give the Temiscouata road connection with the Intercolonial will be out of the woods in ten or twelve days. The surveys will probably be finished by Dec. 1. It is believed that an excellent location has been obtained, the length of the line being estimated at from 180 to 200 miles.

Texas Trunk.—This road, which one month ago was placed in the hands of a Receiver on the petition of the Attorney General of Texas, has been transferred back into the hands of the old management, an order to that effect having been granted by Judge Rainey at Dallas.

Tobique Valley.—The grading on the first 14 miles of this road has been completed, and the ties have been distributed along the line. Some delay has been occasioned by non-arrival of rails, but it is expected that the tracklaying will be completed in two weeks. When placed in operation it will give a large amount of traffic to the New Brunswick road, with which it connects at Andover, N. B. The Grand Trunk survey across New Brunswick meets the Tobique Valley road, and by it the former road could secure a connection to St. John over the New Brunswick line. C. S. B. Mills, of Andover, is Chief Engineer.

Toledo, Ann Arbor & North Michigan.—A five per cent. mortgage for \$10,000,000 on the consolidated lines of the company to the Farmers' Loan & Trust Co., of New York, has been recorded. It covers all the road and its branches, and runs 50 years, and is given to provide for the payment of outstanding bonds, and for the purchase of the Toledo, Ann Arbor & Lake Michigan, the Toledo, Saginaw & Mackinaw, the establishment of a line of steamers and barges across Lake Michigan, and for the construction of docks and terminals on Lake Michigan and at Toledo.

Toledo, Columbus & Cincinnati.—The tracklaying on the extension of this road south from Findlay to Kenton, O., has been completed as far as Arlington, and will probably reach the latter point by Dec. 15. All the grading on the line has been finished and ballasting is now being done.

Topeka, Westmoreland & Marysville.—It is stated that the contracts for grading and tracklaying on this road will be let immediately. The road is to extend from Topeka, Kan., to Odell, Neb., where it will connect with the Burlington & Missouri River. The length will be 125 miles. The first 50 miles will be light work, and the next 40 miles will be heavy, with considerable rock work. The maximum grade is one per cent. and the maximum curves are six per cent. Robert Giles, of North Topeka, Kan., is Chief Engineer, and A. B. Pomeroy, Westmoreland, Kan., is Secretary and Treasurer.

Ulster & Delaware.—Several of the towns of Ulster County, N. Y., which were bonded in aid of the construction of the Ulster & Delaware and Wallkill Valley roads some years ago, recently brought actions against the county to compel the payment of taxes by those railroads, with the exception of road and school taxes, to the towns for the purpose of paying the town bonds issued in aid of building the roads, claiming, under an act of 1869, that such taxes cannot be applied to general county expenses. A test case has just been decided which grants the order asked for. Five other towns will be affected by this decision.

Vancouver & Klickitat.—Surveyors of this line are now at the coal mines near Trout Lake, Washington, and will survey the road from that point to a connection with the survey from the Vancouver end of the line.

Williamsport & North Branch.—Right of way is being obtained for a proposed extension of this road from Halls to Williamsport, Pa., a distance of 10 miles.

Wilmington & Weldon.—O'Hearn Brothers have been awarded the contract for building the extension of the Scotland Neck and Greenville branch from Greenville south to Kingston, N. C., a distance of 25 miles. The work will be light, the maximum grade being 31.68 ft. per mile. There will be one drawbridge 144 ft. long. Fleming Gardner, of Wilmington, N. C., is Chief Engineer.

Wilkesbarre & Williamsport.—The State Department at Harrisburg, Pa., has issued a charter to this company, with a capital stock of \$1,600,000. The road will be 80 miles long and extend from Wilkesbarre through Luzerne, Columbia and Lycoming counties to Williamsport. W. P. Ryman, of Wilkesbarre, is President.

Yadkin.—It is understood that the contract has been let for building this road from Salisbury to Norwood, N. C., a distance of 40 miles. Grading will be commenced by Dec. 15. T. F. Klutz, of Salisbury, is President, and V. Mauney, of Milledgeville, N. C., is Treasurer.

TRAFFIC.

Traffic Notes.

The Queen & Crescent and East Tennessee, Virginia & Georgia roads have put on a Florida special vestibule train, running solid from Cincinnati to Jacksonville via Chattanooga, Atlanta, Macon and Jessup in 28 hours.

Lake vessels are now taking their last cargoes, many of them having been already laid up. At Cleveland it is stated that large contracts for carrying ore next season from Escanaba to Cleveland have been made at the rate of \$1.05 per gross ton.

The Chicago & Alton announces that "At the request of the Chicago & Alton Railroad Co., the American Live Stock Commission Co. have consented to cancel the lease for the 400 Chicago & Alton common stock cars leased to that company, taking effect on Dec. 1." It will be remembered that this lease was made the basis of an action against the Alton by the Interstate Commerce Railway Association, which is still pending. All other actions against the Alton have been withdrawn.

The Chicago & Alton has adopted the following form of notice to be printed on receipts given by it for freight delivered to it to be switched:

Notice is hereby given that the Chicago & Alton Railroad Co. does not receive the property referred to in the within receipt as a common carrier, and it will not be liable as such, but that it simply acts as the agent of the company or party from whom said property is received to perform the switching service only.

The Eastern of Minnesota has made a passenger rate of \$25 first-class from St. Paul to New York over the Duluth, South Shore & Atlantic. The rate to Boston is \$24. These are the same rates that are in force from Duluth to New York and Boston via the Duluth, South Shore & Atlantic and Canadian Pacific. By comparison with the rates by the "Soo" and the Chicago lines, as published in the St. Paul rate sheet, the following differences of rates to Boston are shown: Via Eastern and Duluth, South Shore & Atlantic first-class limited, \$24; second-class, \$21. Via the "Soo" and Canadian Pacific first-class limited, \$28.70; second-class, \$24.40. Via the Chicago lines, first-class limited, \$33.50; second-class, \$28. The first-class rate to Boston via the Eastern and its connections is \$9.50 less than the rate via Chicago. The same rates mentioned above as quoted by the Eastern of Minnesota are also in force over the St. Paul & Duluth, which makes the same connections with the Duluth, South Shore & Atlantic as are made by the first mentioned lines.

The St. Louis east-bound roads have re-adjusted passenger rates from that city to New York on the following basis:

	Limited, first class.	Limited, second class.
Vandalia, all routes.....	\$23.50	\$19.00
Big Four and New York Central.....	23.50	19.00
Big Four and all other routes via Buffalo.....	22.50	19.00
Wabash and New York Central.....	23.50	19.00
Wabash and all other routes via Buffalo.....	22.50	19.00
Ohio & Mississippi and Baltimore & Ohio.....	21.50	18.00
Ohio & Mississippi and Erie.....	21.50	18.00
Ohio & Mississippi and Chesapeake & Ohio.....	20.50	18.00

These rates are to remain in effect from Dec. 8 for a period of three months. The Vandalia has heretofore allowed all the other lines a differential, but now takes the ground that the Big Four and Wabash, possessing good lines to New York, with all modern facilities for speed and comfort, should not insist on maintaining them.

Demurrage Extraordinary.

The establishment of the Cleveland Car Service Association has led to the issuance of a unique circular by a prominent consignee of that city. As embodying ideas which are not without good foundation, and as an expression of sentiments that have already found utterance, but not in so exact a form, we print the circular below. It is taken from a Cleveland paper, which says the author is President Burke, of the Lake Shore Foundry:

"As we are advised, you have in this city a Car Service Association, and demurrage for the detention of cars is proposed to be charged at the unreasonable rate of \$1 per day for each car. Wishing to avoid this exorbitant charge and all contention in respect thereto, and to comply as fully as possible with all rules and regulations adopted with a view to the improvement of the car service and the dispatch of business, we must insist upon the following rules and regulations in regard to all shipments of iron and other material over your line for this company:

"First. You will deliver to us (and leave notice at our office at the time) all cars in the order, and amounts per day as they are delivered to you, and you will not suffer cars delivered to you in any one day to be mixed, or delivered to us with cars shipped on any other day. The observance of this rule upon your part will better enable us to unload cars which we order from day to day.

"Second. You will place all cars at the point of delivery, and remove all empties promptly, so that we may not have to wait for cars to unload, when you have them in your yard; and if we are obliged to wait, we shall charge you on cars containing pig iron \$1 per hour, or fraction thereof, for we can unload a car in that time; and for all other material, whatever it costs us in waiting for cars to be placed.

"Third. We must be notified at once by telephone when you receive cars for us, and notification confirmed by letter, giving car numbers, both original and transfer, and contents of each car.

"Fourth. We shall pay no claim for detention of cars, if, at the time it is presented, we have a claim against the association or railroads for not placing cars as per rule second, and any counter-claim that we may have that your bill is wrongfully made out until both are adjusted.

"We shall keep a correct account of the time when we receive notice of cars in any railroad yard, when we gave notice to place them on our switch, when they were placed, and when they were unloaded, and we must have notice daily of any and all charges for detention of cars.

"You will readily recognize the importance of these rules in aiding us to comply with the rules of the Car Service Association, and we hope by co-operation with the several railroad companies serving us to facilitate the moving of cars and the improvement of the car service."